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The effects of individualized and packaged mental training on dart throwing performance

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THE EFFECTS OF INDIVIDUALIZED AND PACKAGED MENTAL TRAINING ON DART THROWING PERFORMANCE

by

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An Abstract

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ABSTRACT

The purpose of this study was to investigate the effects of individualized and packaged mental training (MT) programs on dart throwing performance and the development of psychological skills. The subjects (N = 46) were male (n = 23) and female (n = 23) college students who ranged in age from 18 to 22 years. This study was conducted over a 6-week period during the 1987 spring semester. All volunteer subjects were beginner or novice dart throwers. Following a pretest that consisted of the written 42-item Psychological Performance Inventory (PPI) (Loehr, 1982) and 50 dart throws for score, subjects were randomly assigned to three experimental groups and one control group. Experimental group subjects were randomly assigned to either individualized or packaged MT programs or physical practice (PP). The Individualized (IND-MT) and Packaged (PK-MT) groups practiced MT exercises and threw 50 darts 5 days/week while the PP group only threw 50 darts/day 5 days/week. The PK-MT group practiced MT exercises designed by Bennett (1977) for approximately 25-min a day 5 days/week. The IND-MT group practiced MT exercises designed by the experimenter's advisor for approximately 25 min/day, 5 days/week. Specific MT exercises were designed for the IND-MT group subjects based on their responses to the PPI. Following the 6-week experimental period, all subjects took a posttest consisting of the PPI and 50 dart throws. Additionally, the PK-MT and IND-MT subjects responded to a

questionnaire that assessed their attitudes towards MT exercises. A repeated measures ANOVA was used to test the hypotheses describing the effects of MT on dart throwing performance. The .05 level of significance was established for all tests. The first hypothesis stated that there will be no significant difference in mean dart throwing performance amoung the four groups following 6 weeks of practice. The second hypothesis stated that there will be no significant difference in mean dart throwing performance between subjects who practiced packaged versus individualized MT. The third hypothesis stated there will be no significant increment in psychological skills of subjects who participated in 6 weeks of MT. Significant differences in mean dart throwing performance did not exist between the four groups following 6 weeks of practice. Significant differences in mean dart throwing performance was not found between subjects who practiced individualized versus packaged MT. Seven one-way ANCOVAs were used to test the effects of MT on the development of psychological skills. The results revealed there were no significant increments in mean psychological skills scores following 6 weeks of MT. The two methods of MT did not produce significant increases in mean dart throwing performance or psychological skills scores. All three hypotheses were accepted. It was concluded that MT was not effective in improving dart throwing performance or in increasing the level of psychological skills.

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A Thesis Presented to the Faculty of
the School of Health, Physical
Education, and Recreation
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In Partial Fulfillment of the
Requirements for the Degree
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Ithaca College

School of Health, Physical Education, and Recreation

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CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

This is to certify that the Master of Science Thesis of

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submitted in partial fulfillment of the requirements for the degree of Master of Science in the School of Health, Physical Education, and Recreation at Ithaca College has been approved.

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Chapter 1

INTRODUCTION

Sport psychology in North America began in the mid-1920s with Coleman Griffith's work at the University of Illinois (Kroll & Lewis, 1970). Griffith (1926, 1928) made many contributions to the advancement of sport psychology, including the authorship of two books which are considered to be classics. By modern day standards, Griffith's approach to the study of sport psychology was motor learning oriented. He studied, for example, reaction and movement times of athletes and other parameters associated with motor performance enhancement. He also conducted a personality study of the Chicago White Sox baseball players that was the forerunner of sport personology.

Following Griffith, there occurred a void of approximately 30 years during which time very little progress took place in sport psychology. However, in 1951 John Lawther, a psychologist and head coach of Men's Varsity Basketball at The Pennsylvania State University, wrote the book Psychology of Coaching. Lawther's book recreated interest among coaches in the application of psychology to sport and served as the forerunner of other applied texts that began to appear in the early 1970s.

The 1960s were dominated by personality studies of athletes using standard psychological tests such as the Sixteen Personality Factor Questionnaire (16PF), The

Minnesota Multiphasic Inventory (MMPI), and other paper and pencil instruments. Although there were many methodological and paradigmatic problems associated with sport personality assessment (Fisher, Horsfall, & Morris, 1977; Martens, 1975), the efforts of sport personologists were valuable in gaining insight and understanding of personality. In brief, sport personologists were experiencing the same problems that personologists at large had discovered in their investigations of personality in clinical and research settings (e.g., the validity and reliability of the measuring instruments). Rushall (1972) and others suggested that sport specific inventories be used to assess athletes' personality. Personality is a difficult area of study. However, the relationship between personality and athlete behavior continues to interest sport psychologists.

In 1979, Martens wrote an important article that changed the direction of sport psychology from a laboratory oriented profession to an applied discipline. "About smocks and jocks" was perhaps the most important article of that era because it encouraged sport psychologists to leave the cozy confines of their laboratories and work with athletes in the real world of sport and physical education. Following Martens' leadership, many sport psychologists changed their foci of attention and began trying to help athletes improve their individual and collective performances. New intervention procedures developed as

sport psychologists began working with athletes at high school, college and university, and professional levels of competition.

In the 1980s the most common intervention procedure that is used to enhance the performances of athletes is mental training (MT). MT is a broad-based term that refers to the practice of a series of exercises designed to improve performance. More specifically, MT consists of training in relaxation, concentration, imagery, goal setting, cognitive restructuring, and other psychological skills. The objective of MT is to develop mind/body unity (i.e., to make athletes whole).

Although many amateur and professional athletes have spoken favorably about the values of MT, there are few well-controlled investigations that have been done to support the value of this approach. Therefore, it was the purpose of this study to investigate the effects of individualized and packaged MT programs on the acquisition of dart throwing. Further, this investigation sought to determine if selected psychological skills (e.g., self-confidence) could be improved through the practice of MT exercises during a 6-week training period.

Scope of Problem

This study was designed to test the effects of individualized and packaged MT exercises on the development of psychological skills and dart throwing performance. The

study was conducted during the 1987 spring semester. Participants were college-aged students who were enrolled in undergraduate courses. All volunteer subjects were beginner or novice dart throwers. Most of the subjects had no previous experience with MT exercises. The study was conducted over a 6-week period. Following a pretest that consisted of a written 42-item Psychological Performance Inventory (PPI) (Loehr, 1982) and 50 dart throws for score, subjects were randomly assigned to three experimental groups and one control group. Experimental group subjects were assigned to either individualized or packaged MT programs or physical practice. The Individualized (IND-MT) and Packaged (PK-MT) groups practiced MT exercises and threw 50 darts 5 days/week while the Physical Practice (PP) group only threw 50 darts 5 days/week. The MT exercises practiced by the IND-MT group were designed by the experimenter's advisor, and the MT exercises practiced by the PK-MT group were developed by Bennett (1977). Following the 6-week experimental period all subjects took a posttest consisting of the PPI and 50 dart throws.

One week after the pretest 15 subjects were randomly selected and asked to take a retest following the same procedures as the pretest. This was done to check the reliability of the psychological skills and dart throwing tests. The same procedures were followed to establish the reliability of the posttest instruments.

Statistical analyses were performed to investigate the effects of individualized and packaged MT programs on the development of psychological skills and dart throwing performance. A repeated measures analysis of variance (ANOVA) was used to determine the effect of MT on dart throwing performance. One-way analyses of covariance (ANCOVA) were used to assess the effects of MT on the acquisition of psychological skills.

Statement of Problem

The purpose of this study was to determine the effects of individualized and packaged MT programs on the acquisition of psychological skills and on dart throwing performance.

Hypotheses

The following null hypotheses were delineated and tested during this investigation:

1. There will be no significant difference in mean dart throwing performance among subjects who participated in 6 weeks of PP and those who did PP and MT exercises.

2. There will be no significant difference in mean dart throwing performance between subjects who practiced individualized versus packaged MT exercises.

3. There will be no significant increment in psychological skills of subjects who participated in 6 weeks of MT.

Assumptions

The following assumptions were made for this study:

1. The subjects understood and answered each question on the 42-item PPI as honestly as possible.

2. The subjects threw darts to the best of their ability during pretest, practice, and posttest sessions.

3. The darts were scored correctly by each subject during training sessions.

4. MT subjects practiced the exercises on the audio cassette tapes.

Delimitations

The following delimitations were established for this investigation:

1. This study involved only college students (N = 46) from a private institution.

2. Psychological skills were measured only by the PPI.

3. Motor performance was measured only by dart throwing.

Limitations

The investigation was limited by the following:

1. The results can only be generalized to individuals who are similar to those in this study.

2. Other measures of psychological skills may yield different results.

3. The results for motor performance can only be generalized to dart throwing.

4. Although supervised, the subjects may not have been doing the actual MT exercises.

5. The posttest dart throwing test was an unreliable measure of motor performance.

Definition of Terms

The following terms were operationally defined to familiarize the reader with the commonly used vocabulary of this study:

Mental Training (MT): Cognitive exercises that consist of both physical and mental relaxation, concentration, imagery, goal setting, and cognitive restructuring.

Mental Practice (MP): "The symbolic rehearsal of a physical activity with the absence of any gross muscular movements" (Richardson, 1967, p. 95).

Physical Practice (PP): The physical performance of a motor skill with the absence of cognitive rehearsal.

Individualized Mental Training (IND-MT): The practice of specific cognitive exercises designed for individuals based on their psychological needs.

Packaged Mental Training (PK-MT): The practice of a general program of cognitive exercises not specifically designed for an individual's psychological needs.

Chapter 2

REVIEW OF LITERATURE

The ability to maximize athletic performance has been a concern of many coaches and athletes throughout the history of sport competition. In an effort to increase athletic performance, modifications have been made to training regimens, diet, and sleep habits. Only recently has the importance of proper mental preparation been realized as an integral part of an athlete's quest to achieve performance excellence.

This chapter's contents are divided into two major parts. First, an overview of the conceptual MT literature will be presented that will contain the following sections: (a) mental training defined, and (b) mental training programs. Second, the research literature will be covered with particular attention given to (a) mental and physical relaxation, (b) imagery, (c) goal setting, (d) concentration, and (e) cognitive restructuring. A summary of this chapter's contents will follow.

Mental Training Defined

Loehr (1982) stated "the whole area of mental training can seem confusing, hopelessly complex, and even at times self-contradictory" (p. 1). Loehr's statement is supported by the varying ways MT is described. Most mental trainers have not operationally defined the term MT. However, they have written of its importance in the quest to achieve

athletic excellence. According to Gauron (1984), "most mental training programs are more or less alike, stressing the development of comparable psychological skills" (p. vii). Porter and Foster (1986) explained MT for peak performance as "the learning, practicing and application of mental and psychological skills" (p. 2). This objective is accomplished through exercises and training in goal setting, cognitive restructuring, positive self-statements, progressive relaxation, imagery, concentration, and learning how to cope mentally with injury and pain.

Harris and Harris (1984) described the mental skills of a MT program as "strategies which allow you to enter competition with the proper mindset which will enable you to perform at your most consistent and highest level" (p. 15). Martens (1987) described MT as a program designed to help coaches and athletes acquire and practice the psychological skills needed to improve the performance and enjoyment of sports. Loehr (1982) incorporated the term Athletic Excellence Training (AET) or Mental Toughness training to describe his program of MT. Loehr's AET program is designed to develop mental strength. "Consistently performing to your peak in the heat of competitive battle requires mental strength, a strength that is fundamentally embodied in a core of acquired mental skills" (Loehr, 1982, p. 3).

According to Bennett and Pravitz (1982), "excelling in mental skills leads to excellence in physical skills"

(p. 3). They contend that preparing mentally before competition can be as important to the enhancement of sport performance as an equal amount of time spent on physical practice. Garfield and Bennett (1984) stated that most athletes acknowledge that achieving peak performance is 60% to 90% mental ability. However, very few elite and recreational athletes have practiced a regularly scheduled and disiplined MT program. Both professional and world class amateur athletes like Jack Nicklaus, Chris Evert, Jean Claude Killy, Bruce Jenner, Greg Louganis, and many others support the value of MT programs for achieving excellence in sport.

Mental Training Programs

The emphasis placed on the psychological skills and the order they appear in a MT program varies from one mental trainer to another. Each mental trainer has his/her own style of instruction. Bennett and Pravitz (1982) begin their Mental Dynamics program with a self-image exercise. The importance of programming the subconscious mind is also stressed. Following the above procedure, relaxation exercises are practiced along with goal setting, imagery, and concentration training. Martens' (1987) Psychological Skills Training (PST) program consists of exercises in imagery, psychic energy management, stress management, attentional skills, and goal setting skills. Martens emphasized that his program in PST "involves

educating athletes about each psychological skill and helps athletes to acquire and practice these skills until they become habitual" (p. 76). Porter and Foster (1986) begin their MT program with exercises in goal setting. They have athletes establish both short-term and long-term goals. In addition to goal setting, athletes are instructed to write down five affirmations for each goal. This practice is followed by exercises in relaxation and guided visualization. Athletes are also encouraged to keep MT logs which are used during personal interview sessions to identify psychological factors contributing to performance. A strong emphasis is also placed on positive self-talk and practicing imagery prior to competition.

Syer and Connolly (1984) developed a 12-week MT program to enhance sport performance. Their program begins with exercises in relaxation and concentration. Following training in relaxation and concentration, visualization exercises are practiced. Their program continues with exercises in goal setting and positive self-talk.

Nideffer (1985) centers his MT program around attention and concentration training. He outlined a 6-week MT program for the development of psychological skills. In the 1st week athletes practice exercises to identify their optimal level of arousal. The 2nd week of the program provides exercises in identifying sources of distraction. Athletes are instructed to keep a log of times when their

concentration has been interrupted. In the 3rd week positive aspects of performance are identified. This procedure is practiced to improve and maintain a high level of motivation. Centering exercises are practiced in Week 4 of the program. The centering exercises help to develop concentration skills. During the 5th week exercises to manage negative attitudes or thinking are practiced. Finally, during Week 6 mental practice and visualization exercises are practiced to enhance performance.

Harris and Harris (1984) stressed relaxation, concentration, visualization, self-talk, goal setting, and communication skills in their MT program. Williams (1986) advises that, when MT skills are introduced to athletes, they should be practiced for 15- to 30-min per session 3 to 5 days/week. Her program of MT consists of psychological skills in goal setting, self-regulation of arousal, imagery training, concentration, and thought control training with emphasis on performance cues and being positive and confident. Gauron (1984) outlined seven major psychological skills in his MT program. He emphasized training in attention control, emotional control, self-rejuvenation and energization, body awareness, developing and maintaining self-confidence, programming the subconcious mind, and cognitive restructuring.

Loehr (1982) advocated strengthing psychological skills in visualization, motivation, relaxation, negative energy

management, meditation, breathing control, and concentration to develop mental toughness. Loehr is also a proponent of using psychological inventories to identify and strengthen individual weaknesses athletes may possess in a particular psychological skill.

Suinn (1986) developed a seven-step approach to aid athletic performance. His program consisted of exercises in relaxation, stress management, positive thought control, self-regulation, mental rehearsal, concentration, and energy control. Suinn used a technique called Visuo-Motor Behavior Rehearsal (VMBR) in his MT program. VMBR consists of exercises in progressive relaxation and guided visualization. These skills are used to modify behavior and enhance performance.

In summary, the value of MT programs have been supported by the testimonies of professional and elite amateur athletes. Generally, the components of MT programs consist of exercises in mental and physical relaxation, visualization, goal setting, concentration, and cognitive restructuring. The order and emphasis placed on these skills is determined by the needs of the individual athlete and the specific approach taken by the mental trainer.

Mental and Physical Relaxation

Nineteen studies were found relating relaxation training to athletic performance. Ten of the 19 investigations found a positive relationship between

relaxation training and performance. As the ability to relax improved, performance also increased. Five of the 19 studies found an improvement in performance for some groups or skills but not for others. Four of the 19 investigators reported no significant increase (.05 level) in performance following relaxation training. PP when coupled with relaxation training was no more effective than PP alone.

The positive effects of relaxation training were reported by De Witt (1980); Doyle (1981); Griffiths, Steel, Vaccaro, and Karpman (1981); Ham and Edmonston (1971); Iselin (1979); and Janda and Cash (1976). Further, Lanning and Hisanaga (1983), LeBoeuf and Wilson (1978), Meacci and Eldon (1985), and Nideffer and Deckner (1970) also reported improved performance following training.

A wide variety of sports were examined by the above investigators. Griffiths et al. (1981), for example, found relaxation training had a positive effect on SCUBA performance. Lanning and Hisanaga (1983) reported an increment in volleyball performance following seven 30-min sessions of Jacobson's progressive relaxation training program. Golf putting performance was improved following relaxation and visualization exercises (Meacci & Eldon, 1985). Doyle (1981) used progressive relaxation (Jacobson, 1930) and Benson's (1975) relaxation training procedures to improve rifle shooting performance. Jacobson's (1930) progressive relaxation training improved football

performance as judged by coaches (De Witt, 1980). De Witt also reported that his procedures improved the performance of basketball players. Finally, Iselin (1979) combined relaxation training, MP, and PP to improve basketball free throw shooting performance.

As reported above, five of the 19 investigations reported increments in performance following relaxation training for some groups of subjects on certain tasks but did not for others. For example, Griffiths, Steel, Vaccaro, Allen, and Karpman (1985) found that relaxation training improved the "Bail-Out" technique in SCUBA but did not improve the Deepwater Quarry Dive. Ungerleider (1985) reported that he used Jacobson's (1930) relaxation procedure with a male athlete who failed to qualify for 1980 Olympic track and field team. He did not, however, indicate the effectiveness of these training procedures. Following the application of Jacobson's progressive relaxation procedures, Caruso (1971) stated that electromyographic (EMG) data showed significant (.05 level) desired reductions in muscular tension of the biceps brachii for the hand press, weight lift, and dynamometer squeeze tasks. However, relaxation training did not reduce muscular tension in the triceps brachii on the weight lifting task. Weinberg, Seabourne, and Jackson (1981) investigated the effects of VMBR (Suinn, 1972), relaxation, and imagery on karate performance. All three treatment groups reported a

significant (.01 level) decrement in trait anxiety. However, only sparring performance was significantly (.01 level) improved. The effects of VMBR on tennis serve performance was examined by Noel (1980). Only the highly skilled subjects improved their service. Low-ability subjects decreased their service performance following VMBR training.

Significant differences (.05 level) in performance following relaxation training were not reported by Chaney and Andreasen (1973), French (1978), Greer and Engs (1986), and Harris (1979). Harris (1979) investigated the effects of 6 weeks of autogenic and progressive relaxation training on women intercollegiate athletes. The athletes' state and competitive trait anxiety levels did not significantly decrease following training. Chaney and Andreasen (1973) investigated the effects of Jacobson's techniques on the neuromuscular tension levels of 48 female dart throwers. Chaney and Andreasen reported no significant difference in neuromuscular tension and dart throwing performance when compared to placebo control subjects. Greer and Engs (1986) used progressive relaxation and hypnosis to improve tennis performance. It was concluded that progressive relaxation and hypnosis along with mental rehearsal of strokes through visualization was no more effective than traditional instruction using explanation and demonstration. French (1978) used EMG biofeedback for tension control during the

acquisition of stabilometer performance. Tension control training significantly (.05 level) reduced tension levels below those of the control group. However, no significant difference was reported for time-on-balance between control and experimental groups.

In summary, the data determining the effect of relaxation training on athletic performance seem to be equivocal. Some investigators, as reported above, found that relaxation training improved skill, whereas others reported either no effect or a decrement in performance. A wide variety of relaxation procedures were reported. Most of the investigations were limited to 6 to 8 weeks. Perhaps this time interval was too short to acquire the relaxation response.

Imagery

Several investigators have written reviews of the effects of visual imagery during mental practice (MP) on motor skill and athletic performance (Corbin, 1972; Denis, 1985; Feltz & Landers, 1983; Martens, 1982; Richardson, 1967a, 1967b; Suinn, 1983; Weinberg, 1982). It should be clarified that MP is not the same as visual imagery. According to Richardson (1967a), MP is "the symbolic rehearsal of a physical activity with the absence of any gross muscular movements" (p. 95). Visual imagery is the process of viewing performance with the mind's eye directing images towards a specific goal or outcome (Syer & Connolly,

1984). Because many of the studies conducted by the above researchers have implemented visual imagery training in their MP programs the investigator will include these reviews in this section.

Following an examination of 25 studies over a 30-year period from 1937 to 1967, Richardson (1967a, 1967b) concluded that visual imagery during MP is beneficial to motor skill performance and skill acquisition. Richardson also indicated that when MP is coupled with PP it is more effective than MP or PP alone. Feltz and Landers (1983) conducted a meta-analysis of 60 studies from 1934 to 1983 relating MP to motor performance. Their findings indicated that mentally practicing a motor skill influences performance somewhat better than no practice at all. This finding was in agreement with Richardson's results. The length of MP sessions were also found to have a significant (.01 level) effect on performance, with sessions under 1-min or between 15- or 25-min producing the largest improvement. Also, the number of practice trials during each MP session revealed a significant (.05 level) performance effect. Investigators who conducted studies that included less than 6 trials or between 36 and 46 trials per session produced effects that were most beneficial for improving performance.

Corbin (1972) reviewed 50 studies from 1934 to 1970 and concluded that MP alone is not as effective as PP, and MP combined with PP is most effective for enhancing motor

performance and skill acquisition. Martens (1982) examined 34 imagery studies from 1970 to 1982 and concluded that almost all of them found visualization to be beneficial to motor and sport performance.

Denis (1985) stated it is difficult to find results showing that MP conditions were not significantly different than control conditions. Four of 15 studies reviewed by Denis (1985) from 1943 to 1985 indicated that visual imagery during MP produced significantly higher (.05 level) gain scores than a control condition, and PP produced significantly higher (.05 level) scores than MP. Six studies showed there were no differences between MP and PP conditions. Three investigators reported that MP combined with PP demonstrated results that were as effective as PP alone. Finally, two studies produced significantly higher (.05 level) effects when MP and PP were combined as compared to PP alone.

Weinberg (1982), following a review of over 30 studies from 1934 to 1981, also concluded that MP was most effective when coupled with PP. Suinn's (1983) review of over 25 MP and imagery studies from 1960 to 1981 indicated that both MP and imagery are valuable for improving performance, but the evidence was not conclusive. Therefore, a comprehensive review that covers studies found by the current investigator and the above mentioned researchers will be presented systematically to gain an indepth understanding of the

literature relating visual imagery to sport and motor performance.

The investigator examined 20 studies that determined the effects of visual imagery on motor performance. Fourteen of the 20 studies showed visual imagery training to have a positive effect on the performance of a motor skill. Six of the 20 studies found that visual imagery did not significantly (.05 level) improve performance.

Improved performance of a motor skill following exercises in visual imagery were found by Hall and Erffmeyer (1983); Kohl and Roenker (1980); Lane (1980); Meacci and Eldon (1985); Mendoza and Wichman (1978); Powell (1973); Rawlings and Rawlings (1974); Ryan and Simons (1982); Shick (1970); Suinn (1972); Turner, Kohl, and Morris (1982); Weinberg et al. (1981); White, Ashton, and Lewis (1979); and Ziegler (1985)

Various motor tasks and sport skills were examined by the above investigators. For example, Kohl and Roenker (1980) studied the effect mental imagery had on bilateral transfer of a rotary pursuit skill. Sixty right-handed males 21 years old were randomly assigned to one of three groups. The groups were (a) mental imagery, (b) physical rehearsal, and (c) control. Analysis of variance calculated on the left hand performance data revealed a significant difference (.01 level) among the groups. A post hoc Newman-Keuls test indicated that there was no significant

difference (.05 level) between mental imagery and physical rehearsal groups. An examination of the treatment x trials interaction (.01 level) showed that the mental imagery group improved at a faster rate across left hand performance trials than did the physical rehearsal and control groups.

Turner et al. (1982) also found that visual imagery training significantly improved (.01 level) bilateral transfer of a motor skill to the non-dominant hand. The subjects were 100 male high school students who had a mean age of 16 years. Turner et al. (1982) also indicated that there was no difference in bilateral transfer between subjects who reported high and low ability to image.

Rawlings and Rawlings (1974) investigated the efficiency of visual imagery on the reminiscence and performance of a rotary pursuit task. The efficiency of visual imagery of 35 female college students was measured by a revised Gordon Test of Visual Imagery Control. Analysis of variance indicated that high scorers had significantly (.001 level) lower reminiscence than low scorers.

The effect of mental rehearsal on the performance of dart throwing was investigated by Mendoza and Wichman (1978). The subjects were 26 male and six female undergraduate college students who ranged in age from 19 to 22 years. All subjects were instructed to throw 25 darts at a target located 3 m away. Following this test, the subjects were randomly assigned to one of four practice

conditions. The conditions were (a) no practice control, (b) mental rehearsal only, (c) mental rehearsal with simulated dart throwing muscular movements, and (d) direct PP. The experimental subjects participated in two 15-min practice sessions per day for 6 days. The control group only participated in posttesting. The posttest consisted of 25 consecutive dart throws. The results indicated that the experimental groups significantly improved (.05 level) performance when compared to the control group. The investigators concluded that PP was more effective than either type of MP, and MP was much more effective than no practice. Powell (1973) examined the effects of positive and negative MP on dart throwing performance. The subjects were 18 female clinical psychology students. The subjects were matched on dart throwing performance and assigned to negative and positive MP groups. The results indicated that the positive imagery group significantly improved (.001 level) 28% from the 1st to the 5th trial of 26 dart throws. The performance of the negative imaging group deteriorated 3% from the 1st to the 5th trial. The positive imagery group significantly improved (.001 level) dart throwing performance when compared to the negative imagery group.

Shick (1970) conducted three experiments to determine the effects of MP on wall volleyball and volleyball serving. For the first study, 10 college women volunteers were randomly assigned to either a MP or control group. The MP

group practiced imaging the volleyball skills twice a day for 3-min over a 2-week period. The results indicated that the MP group performed significantly better (.05 level) than the no practice group for serving. A statistical difference (.05 level) did not exist between the groups for the wall volleyball skill. In the second study, 68 female college students participated in both PP and MP for 5 weeks. The subjects were randomly assigned to 1-min and 3-min of MP. The subjects were tested on service and wall volleyball performance. There was no significant difference (.05 level) between the two groups for wall volleyball performance. However, the 3-min MP subjects did perform significantly better (.05 level) than the 1-min MP group. The 3rd study replicated the procedures of the second study except 36 female college students practiced MP and PP conditions for 3 weeks instead of 5 weeks. Significant differences (.05 level) were not found between the groups for either volleyball skill.

Ziegler (1985) found that kinesthetic prompting during imagery significantly improved (.05 level) free throw shooting performance following nine sessions of practice. Ninety-three university students who were not currently participating in any form of basketball activities served as subjects. Their basketball experience ranged from 4 years of high school basketball to no previous experience.

Meacci and Eldon (1985) studied the effectiveness of a relaxation, visualization, and rehearsal intervention for learning an aggressive golf putting skill. The subjects were male (n = 55) and female (n = 27) undergraduate students who ranged in age from 18 to 21 years. Three experimental groups were comprised of students registering for one of three golf classes. Students enrolled in a tennis class served as a control group. The four groups were (a) relaxation, visualization, body rehearsal intervention; (b) repetition; (c) combination of relaxation, visualization, body rehearsal intervention, and repetition; and (d) control. The control group was only used for testing purposes and was not involved in any type of learning methods. The experimental groups attended 30 learning sessions that were conducted on Mondays, Wednesdays, and Fridays during a 10-week period. The skill test consisted of 25 putts from a distance of 1.83 m on a country club practice green. The number of successful putts was recorded for each student. The results indicated that the relaxation, visualization, and body rehearsal group and the repetition group significantly improved (.01 level) their performance on the 30th session when compared to the combination relaxation, visualization, and body rehearsal group and control group.

Ryan and Simons (1982) investigated the effectiveness of mental imagery on people who were accustomed to using

imagery and those who were not. Eighty male volunteer California Highway Patrol officers served as subjects for this experiment. The results indicated that subjects who practiced imagery and those subjects who did not use imagery but were asked to do so significantly improved (.001 level) their performance on a stabilometer when compared to subjects asked not to use imagery. White et al. (1979) examined the effects of MP, PP, combined MP and PP, and a control condition on the performance of a start/restart skill in swimming. Twenty-four high school and university students who ranged in age from 13 to 27 years served as subjects. The results indicated that subjects who scored high in kinesthetic imagery as measured by modified Betts and Gordon inventories and who used MP performed significantly better (.05 level) on the start/restart skill than subjects scoring low in kinesthetic imagery.

The technique of VMBR combines relaxation with visualization. It was developed by Suinn (1972) to increase the performance of ski racers. The technique was so successful for improving performance with experimental subjects that the coach only raced team members who received VMBR training. Hence, there was no comparable data to test the scientific effectiveness of this method.

Lane (1980) examined the effectiveness of VMBR training on a boys' high school basketball team. Over the course of the season two of three starters who Lane had consistently

worked with significantly improved (.05 level) their foul shooting accuracy from the previous year. One of the players improved 11% and a second demonstrated a 15% increment in foul shooting performance. The percentage of foul shots made by starters who did not participate in VMBR exercises actually decreased. Hall and Erffmeyer (1983) also found that foul shooting performance significantly improved (.05 level) following VMBR training of 10 highly skilled female basketball players.

As reported earlier, Weinberg et al. (1981) found that VMBR training improved karate performance. The subjects were 32 males who ranged in age from 18 to 24 years. However, significant performance results (.01 level) were only found for sparring performance.

Significant differences (.05 level) in performance following imagery training were not reported by Andre and Means (1986); Epstein (1980); Morgan (1984); Noel (1980); Wollman, Hill, and Lipsite (1985); and Woolfolk, Murphy, Gottesfeld, and Aitken (1985). Wollman et al. (1985) conducted two studies that examined the effectiveness of visualization combined with relaxation, relaxation alone, or no treatment. The performance of male college runners (n = 14) and volunteer professional bowlers (n = 13) who used relaxation combined with visualization was not significantly different (.05 level) than control conditions.

The effects of a slow-motion rate of imagery on the performance of "putting" in a Frisbee golf game was investigated by Andre and Means (1986). Sixty-six male subjects were randomly assigned to a standard MP group, slow-motion MP, and attention placebo control group. Experimental treatments repeated over a 5-night period resulted in no significant difference (.05 level) between experimental and control group subjects on the performance posttest. Morgan (1984) found that performance of a coincidental-timing task did not improve for 18 physical education majors who practiced pre-practice imagery, postpractice imagery, or control conditions over a 6-week period.

Epstein (1980) examined the relationship of imaginal style (internal and external) on dart throwing performance. Her subjects were 75 undergraduate volunteers randomly assigned to either an internal imagery group, external imagery group or control. The experiment was divided into four phases. They were (a) imagery assessment, (b) baseline dart throwing, (c) imagery training and dart throwing aided by mental rehearsal, and (d) post-experimental questioning. The results indicated that mean dart throwing accuracy did not differ across the three experimental conditions. However, male and female dart throwing accuracy did differ significantly (.01 level). Male subjects demonstrated a higher skill level when compared to the female participants.

Noel (1980) reported that exercises in VMBR did not produce statistically significant diferences (.05 level) in tennis serve performance among high and low ability male subjects (N = 14) who ranged in age from 17 to 45 years. High ability players demonstrated improved tennis serve accuracy while low ability players experienced a decrement in their serving performance.

The effect of imagery on putting performance in golf was examined by Woolfolk et al. (1985). Fifty college males served as subjects. The results indicated that imagining a negative outcome 1-min before performance may be more powerful in its ability to hinder performance than positive imagery is for its capacity to improve performance.

In summary, the above literature supports the contention that visual imagery is an effective method for improving performance. Fifteen investigators found positive results following imagery training and five researchers found visualization exercises did not significantly improve performance. The effects of imagery training were examined using a variety of sport and motor skills (e.g., basketball, tennis, dart throwing, and rotary pursuit). The investigators indicated that visual imagery training is most effective for improving sport and motor performance when it is coupled with PP. Conditions that influence the effectiveness of imagery training are the amount of experience a performer has with the skill, the type of

visualization (slow-motion rate, negative or positive outcome), and the type of skill practiced.

Goal Setting

Six studies were found that examined the effect of goal setting on sport and motor performance. Two of the six studies reported significant results (.05 level) for performance improvement following goal setting strategies. Four of the six studies indicated that goal setting training did not significantly improve (.05 level) performance.

Studies that reported positive results following goal setting training were conducted by Barnett and Stanicek (1979) and Burton (1983). Barnett and Stanicek (1979) investigated the effects of goal setting in teacher-led group conferences on archery performance. Thirty male and female college students were randomly assigned to two groups. They were (a) group conferences with goal setting and (b) group conferences only. In the group conferences with goal setting condition, the subjects were instructed to set individual verbal and numerical goals. The goals were set at the end of a 10-min weekly conference session using a printed goal setting sheet. The conference sessions for both groups were conducted over a 10-week period. In addition to group conferences all subjects met twice a week for a 50-min archery instruction. The results indicated that the goal setting group achieved significantly higher

(.05 level) scores in archery performance than the non-goal setting group.

Burton (1983) examined the effectiveness of a 5-month goal setting training program on the swimming performances of Big Ten Conference university students. The effects of this goal setting program were investigated using inter-team, intra-team, and case study analyses. The results of the inter-team analyses indicated that swimmers trained in goal setting techniques demonstrated significantly (.05 level) more optimal competitive cognitions and performance than swimmers not trained in goal setting. Intra-team analyses also revealed that goal setting trained swimmers who possessed high goal setting skill demonstrated significantly (.05 level) more optimal cognitions and performance than their low-goal setting skilled teammates.

As reported above, four of the six studies examined the effectiveness of goal setting on sport and motor performance showed no significant improvement (.05 level) following training (Barnett, 1977; Coughlin, 1984; Hollingsworth, 1975; Weinberg, Bruya, & Jackson, 1985). For example, Hollingsworth (1975) examined the effects of specific performance goals and verbal encouragement on the learning of a two-ball, one-hand juggling task. Ninety junior high school students were randomly assigned to a performance goal group, verbal encouragement group, and a control group. The

subjects practiced for 5-min on 12 consecutive school days. Significant differences in performance were not found among the three groups. Barnett's (1977) similar investigation supported Hollingsworth's (1975) findings. The subjects (N = 93) were high school students randomly assigned to treatment and control groups. Significant differences in juggling performance between groups who practiced goal setting techniques and those who did not during a 3-week period were not found.

Coughlin (1984) reported there was no significant difference in basketball foul shooting performance between three women's varsity high school basketball teams that participated in a 7-week goal setting study. The three teams were randomly assigned to two experimental and one control condition. The subjects participated in a skill building program designed to improve basketball foul shooting ability. The subjects were administered a foul shooting accuracy test consisting of 20 free throws taken two at a time, four times during the 7 weeks of the study.

Finally, Weinberg, Bruya, and Jackson (1985) examined the effectiveness of goal setting on sit-up performance of subjects (N = 96) who were male and female members of a college fitness class. They found that specific hard goals (goals quantitatively defined) were no more effective than "do your best" goals and that short-term, long-term, and combined short-term and long-term goals did not

significantly improve performance on a 3-min sit-up skill over a 5-week period.

In summary, six studies were found that examined the effectiveness of goal setting techniques on sport and motor performance. Two of the six studies found positive results and four of the six indicated that exercises in goal setting had no effect on performance. Various sport and motor skills were examined (e.g., swimming, basketball, and juggling). The result of the studies reviewed indicated that exercises in goal setting were only effective for improving performance when the training period was greater than 7 weeks.

Concentration

Six studies were found relating the psychological variable of concentration to athletic performance. There is consistent agreement among the researchers that concentration is an influential factor in relating skilled athletic performance. For example, Gould, Weiss, and Weinberg (1981); Highlen and Bennett (1979); Kauss (1978); Lufi, Porat, and Tenenbaum (1986); and Silva (1979) all reported that the ability to concentrate prior to and during competition is a common psychological variable shared among successful athletes.

A variety of sports were examined by the above investigators. Highlen and Bennett (1979) examined the specific psychological factors that differentiated

successful and unsuccessful elite athletes in the sport of wrestling. The subjects were 40 elite wrestlers, comprising the top 10% of all Canadian wrestlers. The subjects, who ranged in age from 18 to 32 years, were competing for positions on three Canadian National teams. Successful and unsuccessful athletes were differentiated by qualifying for at least one national team. Twenty-four wrestlers qualified and 16 did not. A questionnaire developed by Mahoney and Avener (1977) was used to examine the psychological factors distinguishing successful and unsuccessful wrestlers. Analyses of the data indicated that concentration prior to and during competition was one of the psychological variables that differentiated successful and unsuccessful elite wrestlers. These findings were supported by Gould et al. (1981) who revealed that attentional focusing was one of three psychological factors that distinguished successful college wrestlers (n = 19) from unsuccessful college wrestlers (n = 30) competing in a Big Ten Conference Championship tournament. Statistical analysis (t tests and discriminant function analyses) indicated that successful athletes more frequently focused their attention on only wrestling-related thoughts prior to and during competition.

Kauss (1978) examined questionnaire data to assess the psychological-emotional states of 100 college football players. He reported that both players and their coaches viewed concentration as a significant psychological factor

that tended to enhance skilled performance. Lufi et al. (1986) studied the role of selected psychological variables in gymnastic competitive performance. The subjects were 77 males who ranged in age from 7 to 11 years. At the end of an 8-month training period, the gymnasts participated in two national competitions. A multiple regression analysis revealed that concentration was one of the psychological variables that best predicted success in competition. Silva (1979) investigated the relationship between self-report levels of concentration and subject performance in both a sport and non-sport setting. One hundred and twenty-two volunteer undergraduate students served as subjects. The sport setting examined was a three-on-three basketball game. The results indicated that skilled performance was superior in situations where concentration levels were elevated.

In summary, six studies were found relating concentration to athletic performance. The investigators consistently agree that the ability to concentrate prior to and during athletic competition was one of the psychological factors that distinguishes successful athletes from unsuccessful ones. The literature indicated that, as the ability to concentrate increases, successful athletic performance tends to be improved.

Cognitive Restructuring

Seven studies were reviewed that examined the effectiveness of cognitive restructuring on athletic

performance. Five of the seven investigators found that cognitive intervention procedures successfully improved athletic performance. One of the seven reseachers reported significant results for one experiment. However, he did not find significantly different (.05 level) performance effects for a second investigation. Finally, one of the seven studies reviewed indicated that cognitive strategies had no significant (.05 level) effects for enhancing athletic performance.

Positive effects following cognitive restructuring programs were reported by Gravel, Lemieux, and Landouceur (1980); Meyers and Schleser (1980); Seabourne, Weinberg, Jackson, and Suinn (1985); Silva (1982); and Weinberg, Jackson, and Seabourne (1985). For example, Meyers and Schleser (1980) conducted a case study that evaluated the effects of cognitive interventions with a college varsity basketball player in actual game situations. The subject was a 22 year old starting forward on a National Collegiate Athletic Association Division I basketball team. During a 3-week period, the athlete took part in seven intervention sessions. Assessment activities comprised the first one and one-half sessions, and the last five and one-half sessions were devoted to intervention procedures. The intervention program included progressive relaxation exercises, imagery, and a coping orientation was presented to avoid dwelling on performance errors. After leaving the structured sessions,

the athlete was instructed to practice relaxation procedures and imagery exercises. Post-intervention data were obtained from seven games occurring after the first assessment session. The seven post-intervention games were matched with seven pre-intervention games using minutes played. One-tailed, matched-pairs *t* tests revealed that the athlete's points per game increased significantly (.05 level) from 11.3 to 15.3 points and his field goals made increased significantly (.05 level) from 42.4% to 65.6%. There was no significant difference (.05 level) in the athlete's shots taken. Therefore, the investigators concluded that the athlete's shooting accuracy was improved.

Silva (1982) investigated the effects cognitive intervention programs have on performance. Three case studies were cited. A three-step approach was used to administer the cognitive intervention programs to the athletes. Phase one consisted of identifying the cognitive sets that were responsible for the inappropriate or inadequate performance. The second phase involved cognitive restructuring. In the third phase, the subjects were given self-instructional imagery paired with concentrative cues that were specific to their problem. In case one, the subject was a male, Division I hockey player. Cognitive restructuring was used to decrease excessive penalty time. Following a program that lasted 6 weeks with an average contact time of 3 hr/week the subject decreased his penalty

time 57% from 4.72 min/game to 2.20 min/game. The second case involved a cognitive restructuring program that attempted to decrease excessive fouling marring the play of a male, Division III basketball player. The program was conducted over a 3-week period with an average contact time of 3 hr/week. The subject had a 4.3 fouls per game average prior to the cognitive restructuring program. Following its implementation, the subject had a 3.4 fouls per game average over 10 games. The reduction of fouling resulted in a increased playing time and an improvement in scoring from 6.8 points preprogram to 10.4 points per game during the program. Finally, the third case was implemented to increase the foul shooting accuracy of a male, Division III basketball player. Following a cognitive intervention program that lasted 10 weeks with an average contact time of 4 hr/week the subject's foul shooting accuracy increased 21.05%. Multiple measures of the subject performance indicated a free-throw shooting percentage of 53.86% for the first seven games of the season. Following the intervention program the subject's free throw percentage increased to 74.91%. The results for each of the three case studies indicated that the cognitive intervention strategies were successful in modifying negative or inappropriate behavior and increasing the athletic success of each player.

Gravel et al. (1980) examined the effectiveness of a cognitive behavioral treatment package in channeling the

negative thoughts of cross-country ski racers towards a more adaptive competitive behavior. Twelve males and females, with an average age of 21 years, served as volunteer subjects. The subjects were members of a university cross-country ski team. Subjects were randomly assigned to experimental or placebo groups. The experimental subjects met with the investigator individually for 150 min over three sessions. The placebo group met for 150 min over two sessions. The effectiveness of the intervention program was assessed during races at the Quebec Cup Finals and the North American Inter-Universities competition. A Whitney-U test performed on the data revealed that the experimental group improved significantly (.05 level) more than the placebo control group.

Weinberg, Jackson, and Seabourne (1985) investigated the effect of specific versus non-specific mental preparation strategies on strength and endurance performance. Their subjects (N = 24), who ranged in age from 18 to 28 years, were volunteers recruited from college weight training classes. Each subject performed under four different mental preparation conditions. They were (a) imagery, (b) preparatory arousal, (c) psych-up, and (d) control. The four conditions were practiced 30 s prior to push-up, pull-up, and standing broad jump performance tests. Classes met twice a week for 16 weeks. Performance tests were administered during the 10th, 12th, 14th, and 16th

weeks of classes. The performance results following each mental preparation strategy were analyzed by a series of one-way ANOVAs. The results indicated that the three experimental preparation strategies significantly improved (.05 level) performance when compared to the control condition. Specific and non-specific mental preparation strategies did not differ significantly (.05 level) from each other.

The effects of individualized, non-individualized, and packaged intervention strategies on karate performance was investigated by Seabourne et al. (1985). Forty-three male college students were randomly assigned to one of five groups. These five groups were individualized, non-individualized, package, placebo control, and control. The subjects participated for a 10-week period during which time they spent a minimum of 17 hours practicing their cognitive strategies. Every participant in the study underwent an extensive needs assessment program. This measured areas such as, what situations were anxiety producing to them, how they coped with stress, how they mentally prepared for their activity, their self-talk, concentration problems, and other mental and emotional facets of preparation for karate. Also included in this needs assessment was a 1-hour structured interview that attempted to discover any problems the subjects may be having concerning the mental aspects of karate. This needs

assessment was then used to develop the individualized intervention strategies. The results indicated that the individualized and package groups performed significantly better (.01 and .05 levels, respectively) for karate performance than the non-individualized, placebo control, and control groups.

As reported above, one investigator found significant effects following cognitive intervention procedures for one experiment and did not find significant differences in athletic performance for a second investigation. Meyer, Schleser, Christine, Cooke, and Cuvillier (1979) examined the comparative effectiveness of four different sets of instruction on the acquisition of gymnastic skills of varying difficulty. Positive self-instructions, coping instructions, and negative self-instructions and a set of neutral or didactic instructions were employed in the teaching of one simple and one complex gymnastic skill. Forty females who ranged in age from 7 to 17 years served as subjects. All the subjects participated in a pretest and four training trials with a posttest following each trial. During the first session, the instructor demonstrated the first task while the subjects observed. Following this, each subject performed the skill and was scored by one or two judges. Based on these scores, the subjects were divided into the four instructional groups matched on age and skill level. The subjects then met in small groups with

experimenters who gave them the appropriate instructional package for the first task. Each subject practiced 20 times and was then posttested. This procedure was repeated for the second task. The gymnasts received this trial and the remaining three trials over the next 2 to 4 weeks. A three-way repeated ANOVA indicated a significant (.001 level) performance effect for both skills.

Thirty-six females drawn from YMCA beginners' gymnastic classes who ranged in age from 7 to 15 years served as subjects for the second experiment. This study compared a cognitive practice with PP, a combined cognitive and PP, and a no-practice conditions on three increasingly complex gymnastic tasks. The tasks were round off, dive roll, and back handspring. Group assignments were made on the basis of subject age and skill level. Skill level was assessed using procedures similar to the first experiment. The cognitive practice condition consisted of positive self-instruction statements that were read to the subjects and then cognitively rehearsed during a 30-min period. The PP group physically performed the gymnastic skills for 10-min followed by 10-min rest and 10-min of physical performance. The combined cognitive and PP group received a 5-min cognitive practice, a 5-min PP, a 10-min rest, and an additional 10-min of combined cognitive and PP. Following three 30-min sessions of the assigned treatments, Newman-Keuls post hoc analyses indicated the PP group

performed significantly better (.01 level) than the cognitive practice and no practice groups. The combined cognitive and PP subjects did not perform significantly better (.05 level) than participants in the cognitive, PP, and control groups.

One of the seven studies reviewed indicated that cognitive strategies had no significant effect (.05 level) on improving athletic performance. Weinberg, Gould, Jackson, and Barnes (1980) studied the effects of various cognitive strategies on tennis serve performance of high and low ability subjects. The subjects (N = 40) were males (n = 20) and females (n = 20) advanced and beginning players who ranged in age from 18 to 25 years. The subjects served 10 trials in a serving box that was divided in half. Prior to this the subjects practiced a preservice cognitive strategy. The cognitive strategies were (a) imagery (e.g., subjects imagined hitting the perfect serve); (b) statements of positive self-efficacy (e.g., subjects repeated to themselves "I can and will hit a good serve"); (c) attention focus (e.g., attention was given only to the service); and (d) control (e.g., subjects served in their usual manner). The results indicated that high ability subjects performed significantly better (.001 level) than low ability subjects. Mental preparation had no effect on increasing tennis serve performance among advanced or beginner male or female players.

In summary, seven studies were reported that investigated the effects of cognitive restructuring programs on athletic performance. Five of the seven investigations examined found positive effects following cognitive intervention procedures. One investigator reported significant (.001 level) results for one experiment and no significant difference (.05 level) in performance for a second study. Finally, one of the seven researchers indicated that practicing a cognitive strategy before competition had no effect on performance. In general, the above investigators demonstrated that exercises in cognitive restructuring improved performance. However, several of the studies that were used to support this contention were case studies. Although case studies are valuable, they do not provide comparable data to evaluate the scientific effectiveness of a treatment.

Summary

Only recently has the importance of training mentally been considered as an integral part of an athlete's quest to achieve performance excellence. The testimonies of current and past world class athletes like Jack Nicklaus, Bruce Jenner, Greg Louganis, and many others support the value of MT.

MT programs generally consist of exercises in mental and physical relaxation, visualization, goal setting, concentration, and cognitive restructuring. The data

concerning the effect of relaxation on athletic performance were found to be equivocal. Some investigators found that relaxation training improved skill, whereas others reported either no effect or a decrement in performance. The literature supported the contention that visual imagery is an effective method for improving performance. The investigators indicated that visual imagery training is most effective for improving sport performance when it is coupled with PP. The effectiveness of goal setting was examined on a variety of sport and motor skills (e.g., swimming, basketball, and juggling). The results of the studies reviewed indicated that exercises in goal setting were only effective for improving performance when the training period was greater than 7 weeks. The investigators who examined the effects of concentration indicated that as the ability to concentrate increased athletic performance tended to be improved. Finally, the investigators who examined the effectiveness of cognitive restructuring programs generally indicated that exercises in cognitive restructuring improved performance.

The above psychological skills are typical components of MT programs. The success of psychological skill training depends on many factors, e.g., the length of training, the experience of an athlete, the expertise of the mental trainer, and sport examined.

Chapter 3

METHODS AND PROCEDURES

This chapter will delineate the methods used to investigate the effects of individualized and packaged MT procedures on dart throwing performance and the development of psychological skills (e.g., self-confidence). This chapter is divided into the following sections: (a) subjects, (b) testing instrument, (c) procedures, (d) reliability of tests, and (e) design and statistical treatment of data. A summary of this chapter's contents will be provided.

Subjects

The subjects (N = 46) were male (n = 23) and female (n = 23) students 18 to 22 years old who were attending a private college located in the Finger Lakes region of New York State. All subjects were volunteers recruited from undergraduate courses offered by the college. The subjects were either beginner or novice dart throwers. Most subjects had no previous experience with MT exercises. Some of the subjects were members of intercollegiate athletic teams. All subjects were treated in accordance with the "Ethical Principles of Psychologists" (American Psychological Association, 1981). All of the subjects were asked to read and sign an informed consent form (Appendix A) before participation.

Testing Instrument

The 42-item PPI (Loehr, 1982) measured seven psychological skills (Appendix B). They were (a) self-confidence, (b) negative energy, (c) attention control, (d) visual and imagery control, (e) motivational level, (f) positive energy, and (g) attitude control. The seven skills were assessed by means of 5-item Likert type scales. For example, the first question asked: "I see myself as more of a loser than a winner in competition" (Loehr, 1982, p. 161). Subjects responded to each of the 42-items by encircling one of the following responses: almost always, often, sometimes, seldom, and almost never. The scores of particular test questions were totaled for each of the seven psychological components. For example, questions 1, 8, 15, 22, 29, and 36 produced a total score for self-confidence. A score of 26-30 on the seven items is considered to be excellent. Scores which range between 20-25 show room for improvement and scores of 6-19 reveal the need for special attention (Loehr, 1982).

Loehr (1982) does not advocate adding the seven component scores to produce a total test score. The results are used by mental trainers to develop and evaluate individualized MT programs for athletes. The PPI possesses only face or logical validity.

Procedures

The procedures section will include pretest, assignment of subjects to groups, treatments, dart throwing practice, and posttest. The specific methods used during this 6-week investigation have been outlined in the subsections that follow.

Pretest

The pretest was administered over a 3-day period. Each of the subjects was scheduled into a 25-min time slot for testing. When the subjects arrived for their scheduled appointments, they were instructed of the procedures of the pretest. The pretest consisted of two parts: a psychological skills test and dart throwing. First, each subject completed a written 42-item PPI that measured the subject's psychological skills in seven categories: (a) self-confidence, (b) negative energy, (c) attention control, (d) visual and imagery control, (e) motivational level, (f) positive energy, and (g) attitude control. Before beginning the PPI subjects were instructed by the experimenter to carefully complete each question to the very best of their ability, as honestly as possible. Each subject rated himself/herself on a 5-item Likert-type scale for each of the 42-items. The total points scored on each of the seven test items was then determined by adding the scores on specific questions. For example, the total score for

self-confidence was determined by adding the point values for questions 1, 8, 15, 22, 29, and 36.

On completion of the PPI each subject was led by the experimenter to the dart throwing area to complete the second part of the pretest. At this station, subjects were given a verbal explanation of how the scores for each throw would be calculated. The dart board was arranged in numeric sections, similar to the face of a clock, with the numbers increasing from one to 20. Scoring was explained and demonstrated in the following manner. Each dart that landed in the center red ring was worth 50 points. Darts that landed in the next outer green ring were worth 25 points. Darts that landed in the outer red and green concentric ring were worth double the single point value that corresponded to the numbered section. Darts landing in the inner concentric ring were worth triple the single point value that corresponded to the numbered section. All darts that lodged in the black and white area inside the outer red and green concentric ring were worth the single point value that corresponded to the numbered section. Darts that did not lodge inside the outer red and green concentric ring and that fell out of the board were scored a zero.

A demonstration was given of how to throw the darts properly. Each subject took 12 warm-up throws followed by 50 throws for score. Throws were taken in sets of three. At the end of each set of three throws, the experimenter

followed subjects to the target and recorded their scores for each throw on the pretest score sheet (Appendix C). A total score for each subject was determined by adding each of the 50 darts thrown. Darts were thrown at a regulation board (# 3015, Crown Recreation, Hollins Hills, NY) located 274.32 cm from the target line at a height of 189.23 cm from the floor. All darts were regulation plastic winged (# 71976, Unicorn Products Ltd., London, England) weighing 26 g. Standard classroom lighting was used to illuminate the target plus a four socket keystone movie light system positioned on the ceiling approximately 140 cm from the target.

Assignment of Subjects to Groups

At the end of the pretesting period, subjects were randomly assigned to one control (n = 11) and three experimental groups. The experimental groups were (a) PK-MT (n = 11), (b) IND-MT (n = 12), and (c) PP (n = 12).

Treatments

The MT subjects (PK-MT & IND-MT) practiced MT exercises in a laboratory separate from the dart throwing area where the environment remained constant throughout the 6 weeks of experimental treatments. The experimenter monitored the subjects daily as they did the MT exercises. The MT subjects were scheduled into 30-min rotating time slots for each of the experimental days. During each 30-min time slot, four

subjects entered the laboratory and signed an attendance sheet.

The experimenter provided each subject with a cassette tape that outlined the MT exercises for that week. Four cassette players with headphones were situated on tables at different locations around the room so that subjects could practice MT exercises without being distracted. The subjects were seated in chairs while listening to the MT cassette tapes.

Packaged mental training. The PK-MT group practiced MT exercises designed by Bennett (1977) for approximately 25-min a day 5 days/week. The PK-MT exercises were contained on a series of six tapes. The program was divided into six lessons. Each lesson contained a overview of the exercises to be practiced that week on Side A and a relaxation exercise on Side B for five of the six tapes. On Side B of lesson 6 the subjects did a special exercise in energy flow. The subjects listened to and practiced the exercises on Side A the first day of each experimental week. On the 2nd, 3rd, 4th, and 5th days of each experimental week the subjects listened to and practiced the relaxation exercises on Side B.

The first exercise on Side A of Lesson 1 was titled "Mind Over Body." A brief overview of the contents of the six tapes was given followed by an exercise on the importance of positive thinking. Positive thinking was

described to the subjects as believing in yourself and your abilities. The importance of positive thinking was stressed, and its effect on performance was discussed. For example, believing in yourself will help you achieve success, and doubting your ability will only lead to failure. In this exercise, the subjects were provided with the foundations of MT and exposed to the power of the mind.

The relaxation exercise contained on Side B of Lesson 1 presented an introduction of the procedures that would be followed during exercises. The subjects were instructed to sit with their feet flat on the floor and to rest their hands on their laps. After assuming this position a relaxed state was achieved by the subjects while they received directions from the cassette tapes. The relaxation exercise began by having the subjects practice breathing exercises to relieve surface tensions. The subjects were instructed to inhale deeply and hold their breath to the count of two and then exhale through their mouth. This exercise was repeated twice. The subjects then were instructed to slowly count-down from seven to one while visualizing various colors with each number they counted. Once the count-down was complete a progressive relaxation exercise was practiced. The subjects were instructed to mentally communicate with their bodies by telling different parts to relax. Relaxation started with the head and progressively moved to the feet. Once completely relaxed, subjects

gradually returned to full alertness by counting from one to seven. This process completed the first lesson.

Lesson 2, Side A was titled "Mind Zapping--A 24 Hour Process." In this lesson, the importance of presenting the unconscious mind with positive thoughts and goals was discussed. The subconscious mind was described as being literal, governing and over-seeing all bodily and behavioral functions. Hypnosis was discussed and explained as any situation or condition in which a thought may be introduced to the subconscious mind. For example, if negative thoughts were programmed into the subconscious mind, unsuccessful performance may result. According to Bennett (1977), there are several ways of programming the unconscious mind. First, repetition may be utilized. By continually reinforcing thoughts, the subconscious mind will be programmed. Second, the subconscious mind may be programmed by relaxation. One of the major goals of the Bennett approach to MT was to help the subjects reach relaxed states so that they could program their positive thoughts and goals into their subconscious mind.

The relaxation exercises practiced by the subjects on Side B, Lesson 2 followed the same procedures as outlined in the first relaxation exercise. Once the subjects were in relaxed states, an additional technique was used to bring them into a deeper level of consciousness. The subjects were instructed to visualize comfortable scenes in nature.

While visualizing these scenes, they were told to notice the different sounds and sights surrounding them (e.g., the sun shining or the wind blowing). At this point, the subjects were told to see themselves correctly performing all their athletic dreams and goals. Once this was completed, the subjects were gradually returned to full alertness by counting from one to seven until they were fully conscious, feeling alive, refreshed and ready to meet the next activities on their schedules. This program concluded Lesson 2.

Lesson 3, Side A was titled "Being A Winner." During this lesson, winning was defined as making progress towards or achieving a worthwhile goal. The importance of goal setting was discussed along with seven steps to accomplish this task. In Step 1, the subjects were told to survey themselves and to determine where they stood in respect to their aspirations and dreams. The subjects then rated themselves on a scale of 1-10 on internal and external categories. Examples of internal categories were self-confidence or concentration. Examples of external categories were physical factors, such as speed, agility, and strength. In Step 2, the subjects chose goals based on their survey. Priority was given to goals that received a rating of five or less. In Step 3, the subjects defined their goals as precisely as possible. In Step 4, the subjects determined plans of action for accomplishing their

goals. In Step 5, the subjects committed themselves to successfully achieving their goals. In Step 6, the subjects developed enthusiasm and excitement for their goals. In Step 7, the subjects presented their goals to their subconscious minds.

The relaxation exercise practiced by the subjects on Side 2, Lesson 3 followed the same procedures as the previous relaxation exercises. However, the subjects took more control over the relaxation process. Once fully relaxed, the subjects were told to imagine their dart throwing techniques and to see themselves achieving their goals successfully. Following this visualization period, the subjects were gradually returned to full alertness using the same procedures as the previous relaxation exercises. This process concluded Lesson 3.

Lesson 4, Side A was titled "How to Program Your Goals." In this lesson, the concept of MT was associated with physical training. For example, the subjects were told that effective MT takes as much time as physical training. The idea was reinforced that MT should be completed prior to the event. Also stressed in this exercise was the programming of the subjects' goals. The mind was described as a tape recorder. It has a means for input, such as a microphone, and output, such as sounds. Nothing will issue forth from the machine that has not been previously introduced. The subjects were told that their performances

would reflect the thoughts previously introduced to their subconscious minds. When selecting goals, subjects should be certain that all their thoughts related favorable to their defined goals of maximum athletic development and performance. A five-step systematic approach was presented for the subjects to follow when programming their goals. Step 1 began by having the subjects schedule two sessions a day for mental programming. Step 2 instructed the subjects to create a proper condition enabling the easy introduction of thoughts to the subconscious mind (e.g., repetition or relaxation). In Step 3 affirmations were made (i.e., carefully worded statements of the subjects' goals were presented to their subconscious minds). In Step 4 creative imagery was used to present the goal thoughts to the subconscious mind (i.e., imagining your goal as totally as possible). In Step 5 the subjects were told to use emotionalization to feel the imagery scene as totally as possible in their minds.

The relaxation exercise presented in Lesson 5, Side B required the subjects to accomplish their relaxed state almost entirely on their own. The same relaxation procedures were followed. The subjects were told to remember a previous exercise when they achieved the perfect relaxation state and to feel that moment again. Once in the ideal relaxation state, the subjects were instructed to choose five goals, five affirmations, and five accompanied

visualization scenes. For example, if the subjects' goal was to improve self-confidence, they may repeat the following affirmation: "I am always self-confident" while visualizing themselves achieving their goal. After choosing their first goal, the subjects began to repeat their affirmation five times while visualizing themselves achieving their goal. The subjects continued the exercise by choosing a second, third, fourth, and fifth goal and affirmation to program their subconscious minds. After the subjects chose their five goals and repeated their five affirmations while visualizing, they slowly returned themselves to alertness following the same procedures as the previous relaxation exercises. The above procedures concluded the exercises for Lesson 4.

Lesson 5, Side A was titled "The Secret." This lesson discussed the importance of establishing mental and physical harmony. Also noted was the importance of having a healthy self-esteem. An exercise to develop the subjects' self-esteem was practiced. This was accomplished by having the subjects program the goal of self-esteem into their subconscious minds. The subjects were told to visualize or imagine themselves as persons of great worth and follow previous steps described in earlier lessons to program this goal into their subconscious minds. The subjects were instructed to affirm that which was already true about

themselves. This procedure allowed reality to be produced from thoughts in the subconscious mind.

The relaxation exercise on Side B, Lesson 5 was a continuation of the relaxation exercises practiced on previous tapes. Once the subjects were fully relaxed and visualized their special scenes of nature, they were instructed to repeat positive self-esteem affirmations (e.g., "I am in control of myself"). The subjects visualized each goal as they repeated it and were told to actually see it coming true. This procedure was done to program the subconscious mind. When this was completed, the subjects returned to full alertness following the same procedures as in earlier lessons. The above procedures completed the exercises contained on Lesson 5.

Lesson 6, Side A was titled "Triple Imagery." As in earlier lessons, the subjects were instructed to practice the previous steps used to achieve a relaxed state. Once relaxed and visualizing their scene of nature, the subjects constructed and visualized a mental training room. Once the room was completed, the subjects visualized their surroundings. In particular, the subjects were instructed to imagine an easy chair facing a large 1.83 by 2.44 m viewing screen. The subjects visualized themselves either training for or performing their event 15 min in the future. When this was completed, the subjects visualized themselves being totally successful and achieving the goals they had

set. Once this was completed, they returned to their scenes of nature and gradually removed themselves from these imagined places back to full alertness.

A special relaxation exercise was practiced from Side B, Lesson 6. This exercise was titled "The Energy Flow." This exercise began by having the subjects visualize themselves in a room slowly filling with a special mist. This special mist was described as having a magical quality that was very effective when inhaled. The subjects were told that the mist had the power to relax and heal any injured body parts. The subjects were instructed to inhale the mist and told that only the special qualities of the mist would remain in their systems. The waste air would be breathed out. The subjects inhaled deeply and then directed the energy mist to their dominant arm and hand. The subjects then directed it to the rest of their body by beginning with their face. When this was completed, the subjects took time to state some affirmations to themselves. The exercise in energy flow was completed by having the subjects take three deep breaths. On the inhalation of the third breath, the subjects opened their eyes and felt energized, revitalized, relaxed, and alert. This exercise completed the PK-MT exercises.

Individualized mental training. The IND-MT group practiced MT exercises designed by the experimenter's advisor for approximately 25 min/day, 5 days/week. A

psychological profile (Appendix D) was drawn for each of the subjects based on their responses to questions asked on the 42-item PPI. Specific MT exercises were designed for the subjects based on their psychological needs. For example, the subjects who needed practice in relaxation received exercises in relaxation training. The subjects who scored low in self-confidence received training in self-confidence. All the subjects practiced exercises in visualization, concentration, and goal setting.

At the start of the 3rd experimental week subjects were given dart throwing goal sheets that they completed daily before each MT session (Appendix E). The subjects used their dart throwing goal sheets during the 3rd, 4th, 5th, and 6th experimental weeks. Concentration exercises developed by Mahoney (1984) were practiced by the subjects after the MT sessions during the 3rd and 4th experimental weeks.

Dart Throwing Practice

At the end of each MT session, the IND-MT and PK-MT subjects proceeded to the dart throwing area which was located in a different laboratory. Both the MT subjects and the PP subjects participated in dart throwing 5 days/week for 6 weeks. Upon entering the dart throwing area, both the MT and PP subjects were required to sign an attendance sheet prior to each dart throwing trial. Each of the experimental subjects threw 12 warm-up and 50 throws for score under the

supervision of an experimenter. When the subjects completed their 12 warm-up and 50 throws for score, they totaled their points using a calculator and placed their score sheets in a folder that was specifically provided for them. Within each file folder, graph paper was provided so the subjects could plot their total dart throwing scores for each practice day and determine their progress.

Posttest

The posttest was administered over a 3-day period. Each of the subjects were scheduled into a 25-min time slot for testing. When the subjects arrived for their scheduled appointment, they listened to a cassette tape consisting of the following message:

> Before I give you the instructions for the posttest, on behalf of John Vespi and me, please accept our sincere appreciation for all the time and effort you have given to this experiment. Both of us sincerely thank you! The posttest will consist of three parts for Mental Training subjects and two parts for all other subjects. First, complete with great care the 42-item Psychological Performance Inventory. Answer each question as honestly as you can. Following the psychological skills test, Mental Training subjects will complete a brief questionnaire in which you will be asked to give your opinion about Mental Training. Again, answer each question very carefully and as

honestly as possible. Next, all subjects will take 50 dart throws for score. Be sure to take 12 warm-up throws and then perform to the best of your ability. Again, thank you very much for your cooperation.

At the completion of the posttesting period the experimenter totaled all the scores for the PPI and the dart throwing.

Reliability of Tests

The reliability of the testing instruments was determined 1 week after the pretests and posttests were administered. Fifteen subjects were randomly selected to take a retest of the pretest and posttest. The retests were administered under the same conditions as the pretest and posttest. At the completion of each retesting period, the scores were totaled for the seven items of the PPI and dart throwing. Pearson product-moment correlations were calculated for the pretest and posttest PPI and dart throwing scores.

Design and Statistical Treatments of Data

Descriptive and inferential statistical procedures were used to analyze these data. Group means and standard deviations were calculated for dart throwing and psychological skills variables. Graphical and tabular analyses were used to describe the results of this experiment.

A 2 x 4 factorial design was used to analyze psychological skills and dart throwing performance. Since

randomization does not insure equality, ANCOVA was used to adjust the final posttest psychological skills scores for initial differences that existed between the groups prior to the start of the experiment.

As reported above, the posttest dart throwing test was an unreliable measure of performance (r = -.12). To avoid this problem, a repeated measures ANOVA was used to determine the effect of MT on dart throwing performance.

Summary

The subjects (N = 46) were male (n = 23) and female (n = 23) students 18 to 22 year old who were attending a private college located in the Finger Lakes region of New York State. The subjects participated in a pretest consisting of the 42-item PPI and dart throwing. Following the pretest, subjects were randomly assigned to one control (n = 11) and three experimental groups. The experimental groups were PK-MT (n = 11), IND-MT (n = 12), and PP (n = 12). The experimental subjects threw 50 darts a day 5 days/week for 6 weeks. Prior to dart throwing, the MT subjects practiced MT exercises 5 days/week for 6 weeks. The PK-MT group practiced MT exercises developed by Bennett (1977). The IND-MT group practiced MT exercises developed by the experimener's advisor. These exercises were designed specifically for each subject's psychological needs. Following 6 weeks of treatment, the experimental and control subjects took a posttest consisting of the 42-item PPI and

dart throwing. The reliability of the pretest and posttest was determined 1 week after each of the tests were administered.

Descriptive and inferential statistical procedures were used to analyze the data. The effect of MT on dart throwing performance was determined by a repeated measures ANOVA. The effect of MT on the development of psychological skills was determined by the use of ANCOVA.

Chapter 4

ANALYSIS OF DATA

This chapter contains the results of this experiment. Descriptive and inferential statistics will be presented for dart throwing and psychological skills variables. Graphical and tabular analyses will be utilized in the presentation of data. The hypotheses that were formulated in chapter 1 will be accepted or rejected. The sections of this chapter are (a) reliability of tests, (b) dart throwing data, (c) psychological skills data, and (d) attitudes towards MT. A summary of the chapter's contents will be presented.

Reliability of Tests

The reliability of the PPI and dart throwing tests was determined 1 week after the administration of the pretest and posttest. Fifteen subjects were randomly selected to take retests for the PPI and dart throwing. Testing conditions were the same as the pretest and posttest. Pearson product-moment correlations calculated for the pretest psychological skills scores were $r = .81$, $p = .0002$ and for dart throwing scores were $r = .35$, $p = .09$. Posttest retest correlations for the psychological skills were $r = .94$, $p = .0001$ and for the dart throwing scores were $r = -.12$, $p = .34$.

Dart Throwing Data

The pretest and posttest mean dart throwing scores for the PK-MT ($n = 11$), IND-MT ($n = 12$), PP ($n = 12$), and

Control (n = 11) groups are presented in Figure 1. Following 6 weeks of training, the PK-MT group recorded the greatest improvement in dart throwing performance. The IND-MT and PP groups demonstrated the next greatest increases in dart throwing performance, respectively. The Control group exhibited a decrease in performance. The pretest and posttest descriptive statistics for dart throwing are reported in Table 1. Except for the PP group there was a decrease in standard deviations from their group means following 6 weeks of training. Figure 2 shows the group means/week for the three experimental groups of subjects. Notice the improvement in dart throwing performance for all subjects during the first 3 weeks of the experiment. During Week 4, the PP group experienced a slight decrement in performance, whereas the PK-MT and IND-MT group means continued to increase. Following Week 5, subjects were away from the campus during spring break. When PK-MT and IND-MT subjects returned to the campus to begin Week 6, they experienced a slight decrease in mean dart throwing scores. In contrast, during the 6th week of the investigation, PP subjects significantly improved their mean dart throwing score.

Because of the unreliability of the dart throwing posttest (r = -.12), a repeated measures ANOVA was used to test the hypotheses describing the effects of MT on dart throwing performance. The first hypothesis stated that

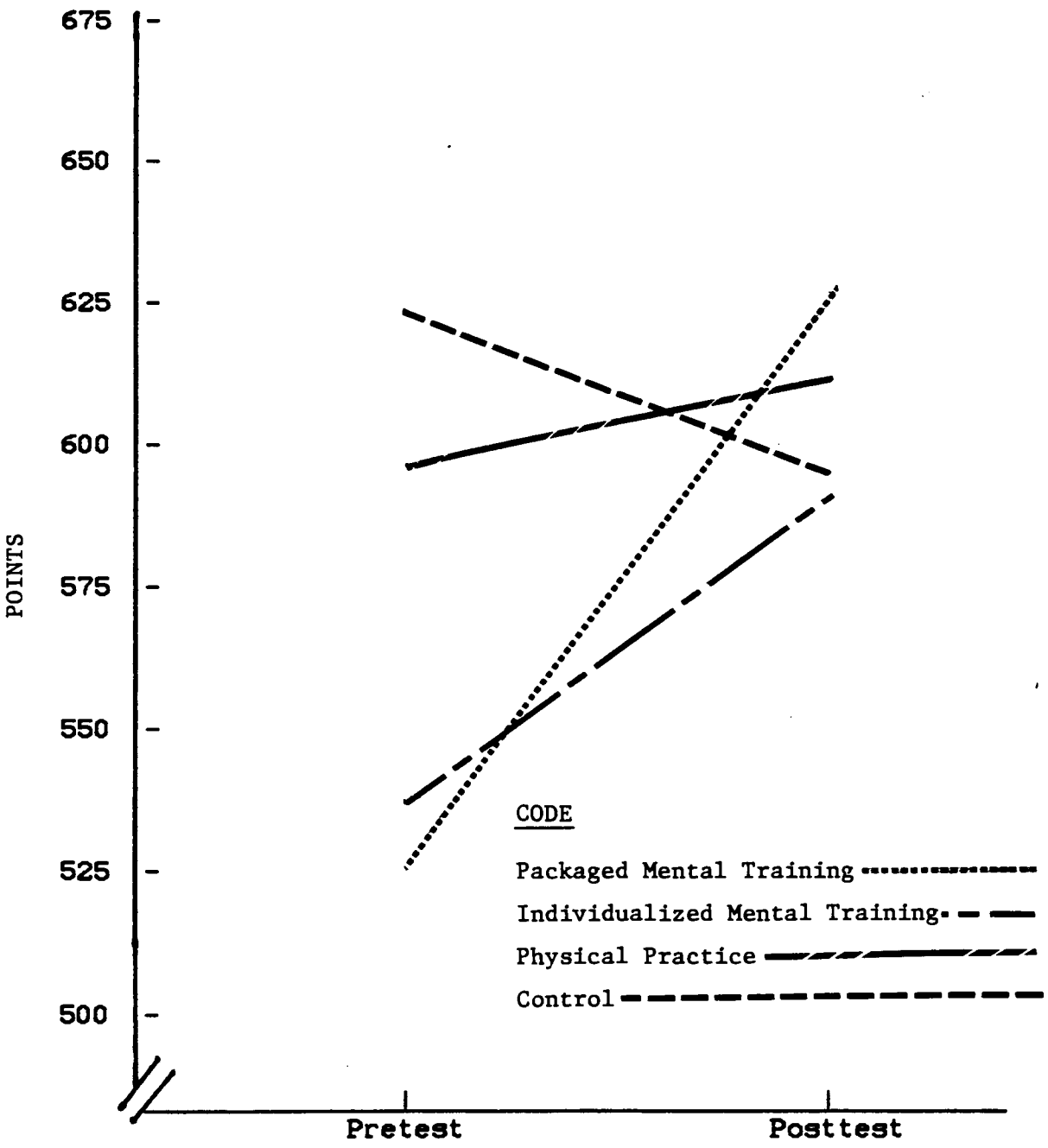


Figure 1. Pretest and posttest mean dart throwing scores.

Table 1

Descriptive Statistics of Dart Throwing Scores

		Pretest		Posttest	
Group	n	M	SD	M	SD
PK-MT	11	527.36	79.02	627.18	46.68
IND-MT	12	537.25	130.21	592.00	56.95
PP	12	598.58	68.94	612.42	97.22
C	11	624.73	103.41	597.91	81.60

Note. PK-MT = Packaged Mental Training, IND-MT = Individualized Mental Training, PP = Physical Practice, and C = Control.

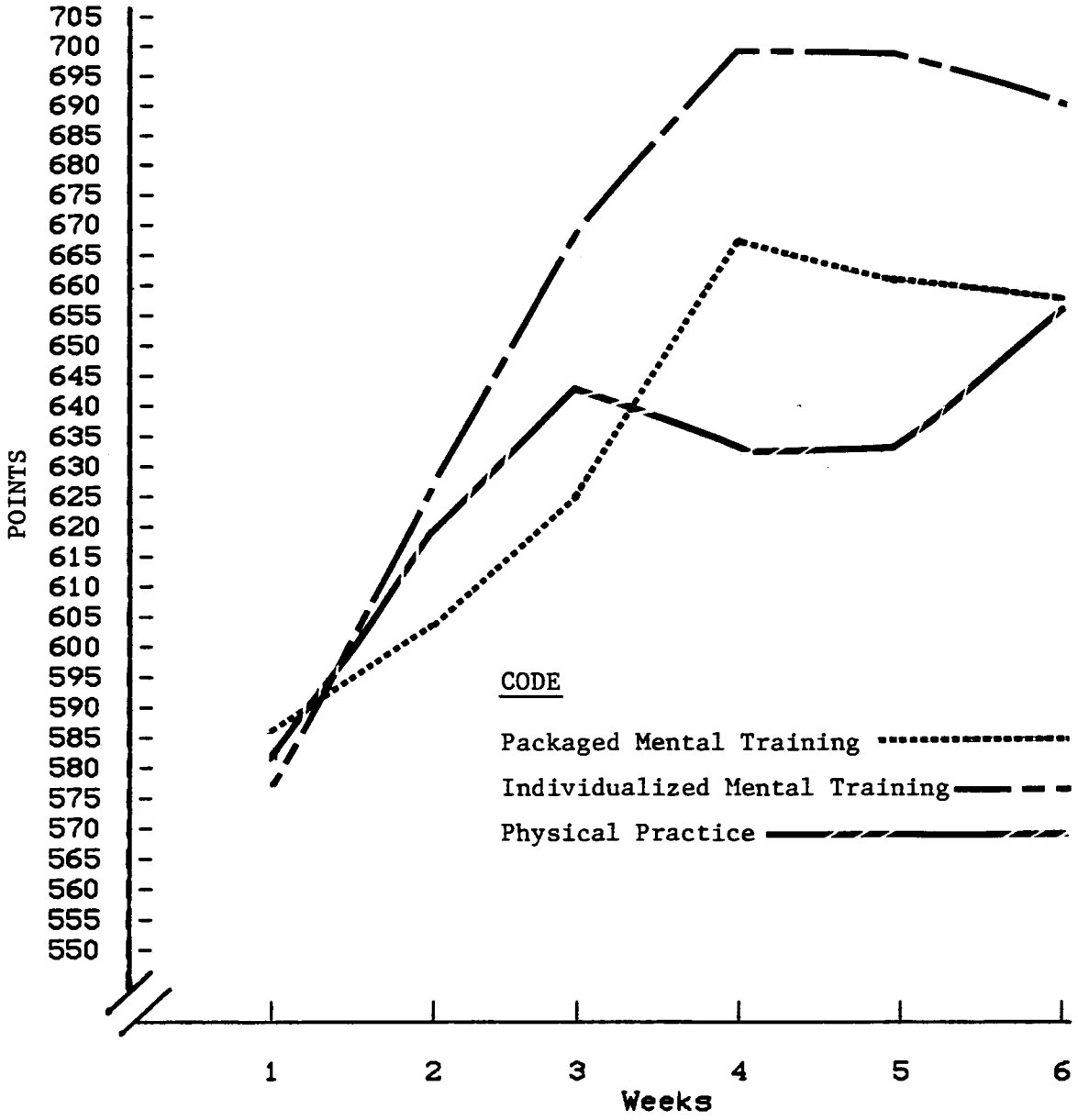


Figure 2. Mean dart throwing scores.

there will be no significant difference (.05 level) in mean dart throwing performance among the four groups following 6 weeks of practice. The second hypothesis stated that there will be no significant difference (.05 level) in mean dart throwing performance between subjects who practiced packaged versus individualized MT.

Table 2 shows that the F-value for training did not reach statistical significance (.05 level). Therefore, the first two hypotheses were accepted. The only statistically significant F found in Table 2 was for Factor B (week). In general, the subjects, except for the Control group, significantly improved (.05 level) their performance during the 6-week training period.

Psychological Skills Data

Figure 3 shows the posttest mean scores of experimental and Control group subjects for the seven psychological skills (i.e., self-confidence, negative energy, attention control, visual and imagery control, motivational level, positive energy, and attitude control). As shown, after 6 weeks of MT, the group means are very similar for each of Loehr's (1982) seven components.

Table 3 presents the group means and standard deviations for each of the seven psychological skills. As shown, the group means, as mentioned above, are very similar. There is also very little difference in group standard deviations.

Table 2

Repeated Measures ANOVA of Dart Throwing Scores

	SS	df	MS	F
Between Subjects				
A (training)				
Subjects Within Groups	763,548.19	32	23,860.88	0.89
Within Subjects				
B (week)	215,771.54	5	43,154.31	21.76[a]
AB	33,319.80	10	3,331.98	1.68
B X Subjects Within Groups	317,265.51	160	1,982.91	

[a]Significant beyond the .001 level.

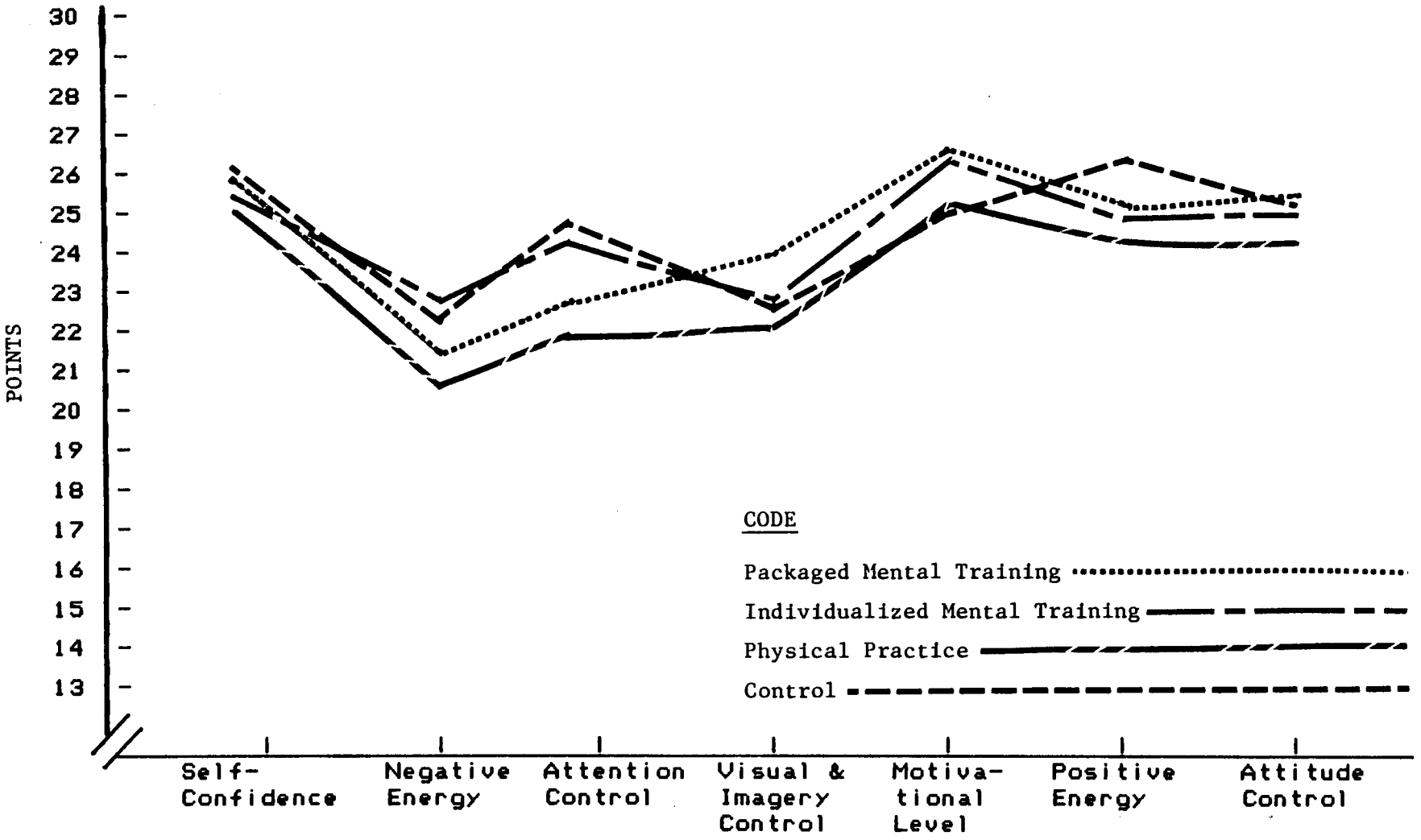


Figure 3. Posttest psychological skills mean scores of experimental and control group subjects.

Table 3

Descriptive Statistics of Psychological Skills

Psychological Skill	Groups															
	PK-MT				IND-MT				PP				C			
	Dep. Var.		Cov.		Dep. Var.		Cov.		Dep. Var.		Cov.		Dep. Var.		Cov.	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
SC	25.9	3.0	23.5	3.1	25.4	2.8	24.4	3.1	25.0	3.2	23.5	2.8	26.2	3.4	24.4	3.1
NE	21.4	2.3	18.7	3.3	22.8	2.2	20.5	3.2	20.6	3.8	19.1	3.9	22.4	3.3	21.9	3.3
AC	22.7	2.2	19.9	2.6	24.1	2.5	22.0	3.1	21.9	4.3	20.8	3.1	24.6	4.1	22.7	4.0
V&IC	23.9	4.3	21.1	4.9	22.8	4.9	20.8	3.5	22.3	4.6	21.0	3.9	22.7	6.0	22.6	5.7
ML	26.6	2.5	24.7	4.6	26.4	2.6	25.8	2.5	25.2	3.2	25.0	2.2	25.1	3.6	24.7	2.9
PE	25.3	2.6	23.3	2.3	25.0	2.6	24.5	2.8	24.3	3.0	24.3	2.8	26.1	3.8	24.7	3.6
ATC	25.5	3.4	23.6	3.1	25.2	2.7	24.5	2.6	24.3	3.7	24.3	2.8	25.3	4.1	24.6	3.7

Note. Groups: PK-MT = Packaged MT, IND-MT = Individualized MT, PP = Physical Practice, and C = Control. Psychological Skills: SC = self-confidence, NE = negative energy, AC = attention control, V&IC = visual & imagery control, ML = motivational level, PE = positive energy, and ATC = attitude control. Statistical abbreviations: Dep. Var. = dependent variable, and Cov. = covariate.

Loehr (1982) does not total the seven component scores to produce a composite psychological skills index. Therefore, seven one-way ANCOVAs were used to test the hypothesis of no statistically significant differences in mean psychological skills scores following 6 weeks of MT. Tables 4-10 indicate that statistically significant increments (.05 level) in the seven psychological skills did not occur as a result of MT. The training in relaxation, concentration, imagery, and other psychological parameters did not significantly improve the subjects' skills on Loehr's seven components. Based upon the above analyses, the null hypothesis of no significant differences in mean psychological skills following 6 weeks of MT was accepted.

Attitudes Toward Mental Training

The subjective attitudes MT subjects possessed towards the individualized and packaged MT programs were assessed following the 6 weeks of participation. The subjects' responses were collected by a questionnaire (Appendix F). The subjects responded to questions about their feelings towards MT and their opinions on its effects on dart throwing performance, school work, and personality. The subjects were instructed to place a check next to a "yes" or "no" response and to provide a written comment if they desired following each question.

The first question asked the subjects if they enjoyed doing the MT exercises. One hundred percent of the IND-MT

Table 4

One-Way Analysis of Covariance of Self-Confidence

Source of Variation	Adjusted SS	df	MS	F
Between	10.50	3	3.50	0.89
Within	161.99	41	3.95	
Total	172.49	44		

Table 5

One-Way Analysis of Covariance of Negative Energy

Source of Variation	Adjusted SS	df	MS	F
Between	16.35	3	5.45	1.03
Within	217.17	41	5.30	
Total	233.52	44		

Table 6

One-Way Analysis of Covariance of Attention Control

Source of Variation	Adjusted SS	df	MS	F
Between	14.55	3	4.85	0.97
Within	204.38	41	4.98	
Total	218.92	44		

Table 7

One-Way Analysis of Covariance of Visual & Imagery Control

Source of Variation	Adjusted SS	df	MS	F
Between	32.83	3	10.94	0.96
Within	467.67	41	11.41	
Total	500.50	44		

Table 8

One-Way Analysis of Covariance of Motivational Level

Source of Variation	Adjusted SS	df	MS	F
Between	17.42	3	5.81	1.33
Within	179.60	41	4.38	
Total	197.02	44		

Table 9

One-Way Analysis of Covariance of Positive Energy

Source of Variation	Adjusted SS	df	MS	F
Between	22.86	3	7.62	1.91
Within	163.78	41	3.99	
Total	186.64	44		

Table 10

One-Way Analysis of Covariance of Attitude Control

Source of Variation	Adjusted SS	df	MS	F
Between	16.02	3	5.34	0.81
Within	269.18	41	6.57	
Total	285.20	44		

and PK-MT subjects (n = 23) reported they enjoyed participating in the MT exercises. The second question asked if dart throwing performance improved as a result of the MT exercises. For the IND-MT group, 3 of the 12 subjects (25%) responded no, and 9 of the 12 subjects (75%) answered yes. Within the PK-MT group, 1 of the 11 subjects (9%) replied no, and 10 of the 11 subjects (91%) reported yes. According to the reports from the PK-MT group, they were more confident that their improvements in dart throwing resulted from their MT.

Next, the subjects were asked if they thought the MT exercises helped improve their grades in school work. For the subjects in the IND-MT group, 7 out of 12 (58%) responded no, 2 out of 12 (17%) answered yes, and 3 of 12 (25%) were unsure and did not respond. For the PK-MT group, 4 of the 11 subjects (36%) replied no, 5 of 11 (45%) reported yes, and 2 of 11 (18%) were undecided and did not respond. The PK-MT group had a greater overall feeling that their grades improved following MT. However, because of the short duration of the MT treatment it was difficult for many of the subjects to notice any changes.

The final question asked if their personality changed as a result of doing the MT exercises. For the subjects in the IND-MT group, 4 of 11 (33%) responded no, and 8 of 11 (67%) answered yes. In contrast, 7 of the 11 subjects (64%) of the PK-MT group replied no, and 4 of 11 (36%) reported

yes. Following 6 weeks of individualized MT exercises, some members of the IND-MT group reported increases in self-confidence, concentration, positive attitude, and ability to relax during dart throwing. The PK-MT subjects who reported a change in personality had varying responses. Two of the subjects (18%) who reported a change noticed an increased ability to relax and concentrate during dart throwing. One of the 11 (9%) subjects who reported a change noted an increase in self-confidence. Another subject reported a negative change, commenting that he had become easily frustrated from participation in the packaged MT exercises. Following these questions, the subjects were asked to comment about any aspects not covered by the above questions. Several of the subjects indicated that too much time was spent on particular lessons and it became difficult to concentrate on the exercises. In contrast, various subjects commented that the MT exercises were beneficial in improving psychological skills (e.g., self-confidence and positive thinking). Overall, the subjects generally indicated that MT exercises could be effective in aiding performance if practiced faithfully.

Summary

Descriptive and inferential statistical procedures were used to analyze these data. Group means and standard deviations were calculated for dart throwing and psychological skills variables. Graphical and tabular

analyses were used to illustrate the results of this experiment. Since the dart throwing posttest was an unreliable measure of performance, a repeated measures ANOVA was used to test the hypothesis of no significant difference (.05 level) in dart throwing performance among the four groups following 6 weeks of practice. MT did not produce significant increments in dart throwing performance. Further, there was no significant difference in dart throwing performance amoung subjects who practiced packaged versus individualized MT programs. Therefore, these hypotheses were accepted.

Seven one-way ANCOVAs were used to test the hypothesis of no statistically significant differences in mean psychological skills scores following 6 weeks of MT. Statistically significant increments (.05 level) in psychological skills did not occur as a result of MT. Therefore, the null hypothesis of no significant differences (.05 level) in mean psychological skills following 6 weeks of MT was accepted. The subjective attitudes of the subjects towards MT were collected from a questionnaire. The subjects were asked their feelings toward MT and their opinions on its effects regarding their dart throwing performance, school work, and personality. The percentage of yes and no responses were provided along with general comments about their MT experience.

Chapter 5

DISCUSSION OF RESULTS

MT has become one of the most utilized interventions in contemporary sport psychology. At the present time, however, there exists very little empirical evidence to support its value. Therefore, it was the purpose of this study to determine the effects of packaged and individualized MT programs on dart throwing performance. The effect of MT on the development of selected psychological skills (e.g., self confidence) was also assessed.

This chapter's contents include a discussion of the results of this investigation. The contents are organized by the hypotheses that were posed in chapter 1. More specifically, there will be a discussion of (a) dart throwing data, (b) psychological skills data, and (c) questionnaire responses. A summary is included at the end of this chapter.

Dart Throwing Data

The first hypothesis stated that there will be no statistically significant differences (.05 level) in mean dart throwing performance among subjects who participated in 6 weeks of PP, no practice, individualized MT, or packaged MT exercises. This hypothesis was found to be tenable. MT, when coupled with PP, did not produce significant increments in mean dart throwing scores.

The findings of the current investigation agree with results reported by Chaney and Andreasen (1973), Epstein (1980), Greer and Engs (1986), Meyers et al. (1979), Noel (1980), and Wollman et al. (1985). They also determined the effect of MT techniques on athletic performance. Chaney and Andreasen (1973) determined the effect of Jacobson's progressive relaxation techniques on neuromuscular tension. Their subjects (N = 48) were females who took a pretest of 20 dart throws from a distance of 3 m at a stationary target. Neuromuscular tension levels were determined by galvanic skin response, respiration rate, and muscular tension. Following 6 weeks of training, there was no statistically significant (.05 level) difference in tension levels and dart throwing performance between placebo controls, exercise controls, and the relaxation groups. The current study investigated Bennett's (1977) relaxation procedure over a 6-week training period and found dart throwing performance was not significantly improved (.05 level). Harris and Harris (1984) indicated that the inability to control muscular tensions produced by anxiety may inhibit smooth coordinated movements and cause a decrement in performance. The 6-week training period of the current investigation and that used by Chaney and Andreasen may have been too short to acquire benefits from relaxation training.

Epstein (1980) examined the relationship between natural imaginal style (internal and external) and dart throwing performance of subjects (N = 75) who were college students. The subjects were randomly assigned to internal imagery, external imagery, and control conditions. Significant differences (.05 level) were not found between the two experimental groups. However, males and females did differ significantly (.01 level) in dart throwing accuracy. Male subjects demonstrated a higher skill level when compared to female participants. The findings of the current study support Epstein's results. Significant differences in dart throwing performance were not found. Although Epstein reported differences in male and female throwing accuracy, the current study did not analyze or compare sex differences in performance.

Greer and Engs (1986) investigated the effects of progressive relaxation and hypnosis on subjects (N = 90) who were being instructed in basic tennis skills. Subjects were assigned to one of three conditions (i.e., progressive relaxation, hypnosis, and control). Following 4 weeks of instructions in hypnosis, relaxation, and visualization of the forehand and backhand drives, significant differences (.05 level) in tennis performance were not found among experimental and control group subjects. Control group subjects who participated in traditional tennis instruction performed as well on the Rally test as experimental

subjects. The current study differed from Greer and Engs' investigation in the measure of performance. Although Greer and Engs examined tennis performance, similar results were found in the current investigation for dart throwing. Larsson (1987) indicated that it is common for beginning subjects not to demonstrate significant performance effects following MT exercises. Therefore, the results of the current investigation are not surprising.

Meyers et al. (1979) investigated the effects of cognitive practice, PP, combined cognitive and PP, and no practice on female subjects (N = 36) who were participating in gymnastic skills. The subjects were assigned to groups on the basis of age and skill level. The cognitive practice condition consisted of positive self-instruction statements that were read to the subjects and then cognitively rehearsed during a 30-min period. The PP group physically performed the gymnastic skills for 10-min followed by 10-min rest and 10-min of physical performance. The combined cognitive and PP group received 5-min cognitive practice, 5-min PP, 10-min rest, and an additional 10-min of combined cognitive and PP. Following three 30-min sessions of the assigned treatments, Newman-Keuls post hoc analyses indicated the PP group performed significantly better (.01 level) than the cognitive practice and no practice groups. The combined cognitive and PP subjects did not perform significantly better (.05 level) than participants in the

cognitive, PP, and control groups. The results of the current investigation are contrary to those reported by Meyers et al. Significant differences between the PP group and the PK-MT and IND-MT groups were not found. Meyers et al. examined a gross motor skill. In contrast, dart throwing is a fine/gross motor skill that requires greater neuromuscular control and is more susceptible to variability among beginning subjects. The above statement is supported by Singer (1968) who stated, "the neuromuscular coordinations involved in fine motor skills are usually precision oriented and often refer to eye-hand coordination" (p. 7). Singer also stated:

> From a theoretical point of view, one might successfully argue that there are certain fine elements to every sport skill. Acts must be placed on a continuum, for nothing is purely black and white, and certainly sport skills would be concentrated toward the gross motor skill end. (p. 7)

Therefore, in agreement with Singer, dart throwing is a fine/gross motor skill.

Noel (1980) investigated the effectiveness of VMBR training on tennis serving performance of 14 male players classified as having high and low ability. Following 10 days of training in visualization and relaxation, serving accuracy was assessed. Significant differences (.05 level) in serving performance were not found among high and low

ability players. High ability players demonstrated improved service accuracy while low ability subjects experienced a decrement in performance. The present investigation did not assign subjects to high and low ability groups because of the small sample size. However, it would have been interesting and important to determine how MT affected subjects of high and low ability. Noel's study suggests that MT interventions may be more effective for higher skilled athletes. Several investigatiors (Chaney & Andreasen, 1973; Epstein, 1980; Greer & Engs, 1986) have indicated that significant performance effects were not found for beginning subjects following their participation in MT intervention procedures. These findings support the contention that low ability subjects may not have developed the physical capability to consistently reproduce a skill that requires both fine and gross motor control. Possible benefits derived from MT may not be manifested by subjects who have not refined the neuromuscular control necessary to physically perform a skill consistently. Also, subjects must have previously stored an image of how to execute the skill in long-term memory if training in visualization is to be effective (Gauron, 1984; Syer & Connolly, 1986; Vealey, 1986).

Wollman et al. (1985) assessed the effects of imagery on sport performance. In the first of two investigations, Wollman et al. studied the effect of relaxation and imagery

on subjects (N = 14) who were members of a men's cross country team. The subjects were assigned randomly to either (a) relaxation, information on running technique, and imagery, or (b) relaxation and running information conditions. Mean running times for the two groups at a cross-country meet were not significantly different (.05 level). In the second experiment, Wollman et al. investigated the effect of relaxation, imagery, attentional focusing, and positive mental attitude on the performance of professional bowlers (N = 13). A control group participated only in the PP of bowling. At the end of 10 weeks of instruction, significant differences (.05 level) were not found in mean tournament bowling scores. The results of the present study support Wollman et al.'s findings. According to Unestahl (1982), "mental training can even sometimes cause an initial decline in performance in the same way as can happen when athletes change to a new (and better) technique" (p. 10). It is possible that a 6-week period is too short for subjects to become skilled at practicing MT techniques. Therefore, significant performance effects for dart throwing would not be expected until subjects had learned how to employ the MT procedures effectively.

The finding of the current investigation are in contrast to those reported by Hall and Erffmeyer (1983); Lane (1980); Meacci and Eldon (1985); Meyers and Schleser (1980); Mendoza and Wichman (1978); Powell (1973); Silva

(1982); Seabourne et al. (1985); Suinn (1972); Weinberg et al. (1981); and Weinberg, Jackson, and Seabourne (1985).

Hall and Erffmeyer (1983) investigated the effects of VMBR training on foul shooting performance of 10 highly skilled female members of an intercollegiate basketball team. The players were randomly assigned to either a VMBR (videotaped modeling) condition or a progressive relaxation and imagery (no modeling) condition. Following a 5-day practice period, the VMBR group had significantly improved (.05 level) performance when compared to the progressive relaxation and imagery condition. In contrast to Hall and Erffmeyer's investigation, the present study only examined beginning and novice subjects. Corbin (1972) indicated that imagery training is more effective for experienced subjects because they are more capable of formulating an accurate picture in their mind of how the skill should be performed. Although both groups in Hall and Erffmeyer's study contained highly skilled players, the group that used videotaped modeling performed significantly better (.05 level). Perhaps the reinforcement of viewing a videotaped sequence of how to perform a skill correctly aids the imagery process, thus enhancing performance. The visualization training in the present investigation may not have been effectively practiced because subjects may have been unable to formulate vivid images of how to perform dart throwing correctly.

Lane (1980) examined the effectiveness of VMBR training on members of a boys' high school basketball team. Over the course of a season Lane found that VMBR training significantly improved (.05 level) the foul shooting performance of two players he had consistently worked with. In contrast to Lane's study, the present investigation was only conducted for 6 weeks. Lane's findings indicated that MT interventions are more effective when they are administered for a longer period of time. For example, a basketball season is at least 3 months long.

Meacci and Eldon (1985) studied the effectiveness of relaxation, visualization, and rehearsal intervention on learning an aggressive golf putting skill. Their subjects (N = 82) were male and female college students who were assigned to one of four groups. The four groups were (a) relaxation, visualization, and body rehearsal intervention; (b) repetition; (c) combination of relaxation, visualization, body rehearsal intervention, and repetition; and (d) control. During a 10-week period 30 training sessions were conducted on Mondays, Wednesdays, and Fridays. The results indicated that the relaxation, visualization, and body rehearsal group and the repetition group significantly improved (.01 level) performance when compared to the combination and control groups. Although the current investigation and Meacci and Eldon's study both utilized 30 MT sessions, different results were found. In the current

investigation, the 30 MT sessions were conducted over a 6-week period with practice occuring on 5 consecutive days each week. In contrast, Meacci and Eldon conducted their study for a 10-week period with practice on alternate days. The findings of Meacci and Eldon's study suggest that MT is more effective when it is practiced over a 10-week period and when training is separated by a day of rest.

Meyers and Schleser (1980) conducted a case study that determined the effect of cognitive intervention procedures on the shooting performance of a male Division I varsity basketball player. Following 7 weeks of practicing relaxation and imagery exercises, the subject's shooting accuracy significantly improved (.05 level). Although Meyers and Schleser's findings are case study results, they do suggest that MT interventions are effective. However, the differences between the findings of the current investigation and Meyers and Schleser's results may be due to several factors. First, Meyers and Schleser examined the effects of MT procedures on a highly skilled athlete. The present investigation used beginner and novice subjects. Second, Meyers and Schleser's training period was conducted for 7 weeks. In contrast, the current study analyzed performance following 6 weeks of training. Finally, Meyers and Schleser examined the effect of MT on basketball shooting performance. This skill required a combination of gross movements compared to dart throwing which incorporated

both fine and gross neuromuscular control. These differences in procedure may have contributed to the contrasting results found by Meyers and Schleser and the present investigator.

Mendoza and Wichman (1978) investigated the effect of mental rehearsal on dart throwing performance of 26 male and female college students. The subjects were randomly assigned to one of four practice conditions. The conditions were (a) no practice control, (b) mental rehearsal only, (c) mental rehearsal with simulated dart throwing muscular movements, and (d) direct PP. Following two 15-min practice sessions per day over a 6-day period, the results indicated that experimental subjects significantly improved (.05 level) their performance when compared to the no practice control group. The experimentors concluded that PP was more effective than either type of MP, and MP was much more effective than no practice. The present investigation differed from Mendoza and Wichman's study in the length of the training sessions. Mendoza and Wichman's shorter length MT sessions of 15-min twice a day may be more effective than the present study's 25-min session once per day.

Powell (1973) examined the effects of positive and negative MP on dart throwing performance of 18 female college students. The subjects were matched on dart throwing performance and assigned to negative and positive MP groups. The positive and negative imagery conditions

were practiced prior to five trials of 26 dart throws. The results indicated that the positive imagery group performed significantly better (.001 level) than the negative imagery group. Powell's findings indicate that negative thoughts are damaging when they are experienced prior to performance. If subjects in the current investigation experienced negative cognitions prior to dart throwing, they may have hindered their performance.

Seabourne et al. (1985) conducted a study that closely resembled the present one. They determined the effect of individualized, non-individualized, and package intervention strategies on karate performance. Their subjects were 43 male volunteer college students who were enrolled in a university self-defense class. The subjects were randomly assigned to one of five conditions: (a) individualized, (b) non-individualized, (c) packaged, (d) placebo control, and (e) control. Following a 10-week training period, the results showed that the individualized and package groups performed karate significantly better (.01 and .05 levels, respectively) than the non-individualized, placebo control, and control groups. The present investigation differed from Seabourne's et al. study in two obvious ways. First, the Seabourne et al. training period was 10 weeks compared to 6 weeks for the present investigation. Second, the criterion measure of performance was different. Karate requires a

combination of gross muscular movements whereas dart throwing involves both fine and gross motor patterns.

Silva (1982) conducted three case studies that determined the effectiveness of cognitive intervention procedures on the performances of university varsity athletes. A three-step approach was used to administer the cognitive intervention programs. Phase one consisted of identifying the cognitive sets that were responsible for inappropriate or inadequate performance. The second phase involved cognitive restructuring. In the third phase, the subjects were given self-instructional imagery paired with concentrative cues that were specific to their problems. In case one, a male Division I hockey player reduced his penalty time from 4.72 min/game to 2.20 min/game. The intervention program was conducted over a 6-week period with an average contact time of 3 hr/wk. In the second case, a 3-week program with an average contact time of 3 hr/wk was used to decrease the excessive fouling of a Division III male basketball player. The program decreased the subject's fouls per game from 4.3 to 3.4 over a 10-game period. In case three, the shooting accuracy of a male Division III basketball player was increased. Following a 10-week program with an average contact time of 4 hr/wk, the subject's shooting accuracy increased from 53.86% to 74.91%. The case studies conducted by Silva provide valuable support for MT programs, in particular the individualized approach

to MT. However, as Silva stated, the "lack of strong control designs have always been a criticism of the case study approach" (Silva, 1982, p. 461).

Suinn (1972) investigated the effects of VMBR on six ski racers. The subjects were matched against a control group of equal ability. The six ski racers who received VMBR training performed so well that they were used for all races. The coach did not race members of the control group. Therefore, comparable data were not available to test the scientific effectiveness of Suinn's program. Ideally, investigators who are interested in improving athletic performance prefer examining the effects of MT interventions on athletes or athletic teams. However, as indicated by Suinn, very few coaches will allow reseachers to randomly assign their athletes to experimental and control groups. Therefore, the present investigator decided to examine dart throwing, a motor skill that does not require team participation. Also, dart throwing was chosen for several other reasons. First, dart throwing is a closed skill where the physical conditions remain consistent. Also, dart throwing can be accurately scored.

Weinberg et al. (1981) investigated the effects of VMBR, relaxation, and imagery on karate skill, combination, and sparring performance of 32 male college students. The subjects were matched on skill combinations and assigned to either a VMBR, relaxation, imagery, or attention-placebo

condition. Following a 6-week training period, all three treatment groups exhibited a significant (.01 level) decrease in trait anxiety. However, Weinberg et al. reported that only sparring performance was significantly (.01 level) improved. The present study was similar to Weinberg et al.'s investigation in training length. However, significant training effects were not found. Weinberg et al. indicated that MT was effective for some motor skills but not others. His findings suggest that MT is an effective intervention for improving performance. However, MT may effect skill development differently in various sports.

Weinberg, Jackson, and Seabourne (1985) also investigated the effect of specific versus non-specific mental preparation strategies on strength and endurance performance. Twenty-four male volunteers who were members of college weight training classes served as subjects. Each subject performed under four different mental preparation strategies. They were (a) imagery, (b) preparatory arousal, (c) psych-up, and (d) control. Each of the mental preparation strategies were employed by the subjects 30 s prior to their participation in push-up, pull-up and standing long jump performance tests. Performance tests were administered during the 10th, 12th, 14th, and 16th weeks of classes. The results indicated that the three experimental preparation strategies significantly improved

(.05 level) performance when compared to the control condition. Specific and non-specific mental preparation strategies did not significantly differ (.05 level) from each other. These findings were supported by Powell (1973) who indicated that the type of cognitions (negative or positive) experienced by subjects prior to competition can significantly influence performance. If the subjects of the current investigation experienced negative thoughts prior to performance, they may have damaged their ability to throw darts accuractely.

There are many reasons why MT failed to produce significant increments (.05 level) in dart throwing performance. The most logical explanation of why MT did not work is the 10-day break in training which occurred between the 5th and 6th weeks. Following this break, the subjects in the PK-MT and IND-MT groups experienced decrements in performance. This finding reinforces the beliefs of mental trainers such as Gauron (1984), Bennett and Pravitz (1987), and others who suggest a daily period of MT for as long as 3 months. Zilbergeld and Lazarus (1987) provided credence for the above statements when they stated "you should do some mental training every single day until you achieve your goals" (p. 75).

Another reason why MT did not produce significant increments in dart throwing performance may have been due to the shortness of the training period. Six weeks of training

may have been too brief to produce significant changes in behavior. According to Larsson (1987), a 2-3 month training period is a relatively short time for beginning and novice subjects to demonstrate improvements from MT.

Also, it is difficult to gain statistical significance when the number of subjects per group is less than 30 persons. In the present study, sample size was limited to 12 subjects per group. Therefore, the degrees of freedom were small and the F-value needed to gain statistical significance was large.

A further explanantion of the failure of MT to produce significant increments in dart throwing performance may have been associated with the unreliability of the criterion measure, the dart throwing test. As reported earlier, dart throwing was found to be an unreliable measure (r -.12) of performance for beginning and novice performers. E. D. Ryan (personal communication, September, 1987) reported that he has stopped using dart throwing as a criterion measure because of the test's unreliability.

A final explanation of why MT did not produce significant increments in dart throwing performance may have been due to the wide variety of skill levels among the subjects of this investigation. Perhaps MT only works well for subjects who have gained considerable skill in dart throwing. Several mental trainers (e.g., Corbin, 1972; Gauron, 1984; Syer & Connolly, 1986; Vealey, 1986) have

suggested that visualization is only effective in improving performance when subjects have a clear image of how to execute the task. The image must be stored in long-term memory. In the present study, several subjects were beginners who had no experience with dart throwing. A demonstration of how to throw the darts properly was given by the experimentor prior to the dart throwing pretest. However, as Larsson (1987) indicated, a reasonable level of motor skill is required before beginning and novice subjects will demonstrate improvement from relaxation and visualization exercises. Perhaps low-ability subjects could not profit from the visualization exercises because they did not internalize a clear vivid image of how to perform the task. On the other hand, some subjects were more skilled and had greater success with dart throwing. Thus, the performances of these subjects may have canceled each other.

The second hypothesis stated that there will be no statistically significant difference (.05 level) in mean dart throwing scores between subjects who practiced packaged versus individualized MT exercises. This hypothesis was found to be tenable. Six weeks of participation in PK-MT and IND-MT exercises did not produce statistically significant differences (.05 level) in mean dart throwing performance. Therefore, this hypothesis was accepted.

As reported above, Seabourne et al. (1985) conducted a study similar to the present one. The results of the

current investigation are in agreement with Seabourne et al.'s findings. They indicated that statistically significant differences (.05 level) in karate performance did not exist between groups of subjects who practiced individualized and packaged MT exercises. However, the individualized and packaged MT groups performed significantly better (.01 and .05 levels, respectively) than the non-individualized, placebo control, and control groups.

Seabourne et al.'s (1985) investigation differed from the current one in training length. Their study was conducted for 10 weeks. In contrast, the current investigation was conducted over a 6-week period. Also, as mentioned above, Seabourne et al.'s study involved a gross motor skill. The present investigation determined the effects of MT on a fine/gross motor skill. Seabourne et al.'s study was the only investigation found that compared the effects of packaged versus individualized MT programs.

Clinial support for individualized MT programs was provided by Heyman (1984), Meyers and Schleser (1980), and Silva (1982). They demonstrated that an individualized format successfully improved boxing, basketball, and hockey performance, respectively. However, Meyers and Schleser's (1980), Heyman's (1984), and Silva's (1982) investigations were case studies of gross motor skills. Case studies are valuable, but they do not provide comparable data to test the scientific effectiveness of an intervention procedure.

Speaking of his applied research data, Rushall (1984) stated that as impressive as case study results are "they are not scientific data" (p. 51). However, "they do suggest some hypotheses for research" (p. 51).

At the present time, there exists little empirical research that has examined the effectiveness of a packaged MT program. Kirschenbaum and Bale (1980) indicated that members of a university varsity golf team who participated in their Brain Power Golf (BPG) program improved performance. However, these data were not assessed statistically. Therefore, the effectiveness of the BPG program is only suggestive.

As mentioned above, statistically significant performance effects (.05 level) were not found for dart throwing or the development of psychological skills following the 6-week training period of the current investigation. The PK-MT and IND-MT groups did demonstrate greater improvements in mean dart throwing performance compared to the PP and control groups over the 6-week training period. Although not statistically significant, these findings may support the practical value of MT.

According to Isacc and Michael (1971), it is important to evaluate practical versus statistical significance when analyzing results. "Are the gains important enough to be worth the cost and effort to obtain them" (Isacc & Michael, 1971, p. 144)? Since 1/100th of a second may separate gold

and silver medal winners in the 100 m dash, any improvements derived from MT may contribute greatly to an athlete's success. D. V. Harris (personal communication, November, 1986) reported that applied sport psychologists need not be concerned with statistical significance because when working with elite athletes any increment in performance is significant. However, because these data did not reach statistical significance (.05 level), the mean differences between the PK-MT, IND-MT, and PP groups may not be attributed to a particular treatment. The results found may only represent chance differences between the groups.

During the 6 weeks of training 30 practice sessions were scheduled for the subjects within the PK-MT, IND-MT, and PP groups. Practice sessions were held on consecutive days Monday through Friday. However, if any of the subjects were unable to attend one of these sessions, he/she could make up the missed days on Saturday and Sunday of that week. Over the course of the 6-week training period only four subjects missed one or more practice sessions. A total number of eight sessions were missed and not made up by these four subjects. There was a 99% compliance rate for training attendance among the 35 experimental subjects who participated in this investigation.

In summary, the results of the current study are opposite to those reported by the above investigators who

demonstrated that individualized and packaged intervention strategies successfully improved performance.

Psychological Skills Data

The third hypothesis stated there will be no significant increment (.05 level) in psychological skills of subjects who participated in 6 weeks of MT. This hypothesis was found to be tenable. Significant increments (.05 level) in psychological skills scores were not found following 6 weeks of MT.

The topic of psychological skills development has received little attention in the scientific literature. One reason why this subject has not been investigated is the limited number of paper and pencil inventories that have been developed to assess psychological skills. Also, the validity and reliability of these instruments to accurately measure psychological skills has been suspect (Mahoney & Epstein, 1981).

Studies were not found that examined the effect of MT on the development of a composite number of psychological skills. Only the development of single psychological skills, such as visualization or relaxation, were found in the literature. Prior to this investigation, Loehr (1982) was the first sport psychologist to develop a multiple psychological skills inventory. His instrument measured seven psychological skill components. They were (a) self-condfidence, (b) negative energy, (c) attention

control, (d) visual and imagery control, (e) motivational level, (f) positive energy, and (g) attitude control. The seven skills were assessed by means of 5-item Likert type scales. However, Loehr's (1982) 42-item PPI had only face or logical validity. Following the present investigation, Mahoney (1986) developed a 51-item Psychological Skills Inventory for Sports (PSIS) that measured anxiety management, concentration, self-confidence, mental preparation, and team emphasis. He reported that his test was both reliable and valid. Mahoney's (1986) PSIS revealed significant differences in psychological skills (.0001 and .05 levels) between elite and non-elite and elite and pre-elite athletes, respectively.

The development of reliable and valid measures of psychological skills is the first step in establishing effective interventions for athletes. For an intervention procedure to be effective, an accurate assessment of the athlete's strengths and weaknesses must be determined. This void has been the weakness of many MT programs. A methodologically sound MT program should consist of an initial assessment, intervention, and reassessment. This procedure has not been followed by many sport psychologists and has resulted in deficient MT programs. Most investigators have only determined the effect of MT on performance or the development of a single psychological skill. According to Unestahl (1982), physical conditioning

is only temporary. In contrast, MT has the potential to create long lasting positive mental conditioning. It is critical that future investigators emphasize the development of a complete set of psychological skills because ultimately a sound mind directs the actions of a sound body.

The present investigation assessed psychological and physical skills, provided an intervention, and reassessed psychological and physical skills. Following this procedure statistical analyses were calculated on these data. The results indicated that packaged and individualized MT procedures coupled with PP were no more effective than PP alone in improving performance.

Questionnaire Responses

The subjective attitudes that PK-MT and IND-MT subjects possessed towards MT were assessed following 6 weeks of participation in MT exercises. The results revealed that 100% of the subjects indicated that they enjoyed participating in MT exercises. When asked if they believed MT exercises improved their performance, 3 of 12 subjects (25%) within the IND-PK group responded no and 9 of 12 subjects (75%) answered yes. For the PK-MT group, 1 of 11 subjects (9%) replied no and 10 of the 11 subjects (91%) reported yes. These findings were supported by Straub (1984, 1985, 1987) who reported that over 90% of his subjects who participated in MT exercises stated that they enjoyed the experience and felt it was beneficial to

performance. According to the reports from the PK-MT group, they were more confident that their improvements in dart throwing resulted from their MT.

Next, the subjects were asked if they thought the MT exercises helped improve their grades in school work. For the subjects in the IND-MT group, 7 out of 12 (58%) responded no, 2 out of 12 (17%) answered yes, and 3 of 12 (25%) were unsure and did not respond. For the PK-MT group, 4 of the 11 subjects (36%) replied no, 5 of 11 (45%) reported yes, and 2 of 11 (18%) were undecided and did not respond. The PK-MT group had a greater overall feeling that their grades improved following MT. However, because of the short duration of the MT treatment it was difficult for many of the subjects to notice any changes.

The final question asked if their personality changed as a result of doing the MT exercises. For the subjects in the IND-MT group, 4 of 11 (33%) responded no and 8 of 11 (67%) answered yes. In contrast, 7 of the 11 subjects (64%) of the PK-MT group replied no and 4 of 11 (36%) reported yes. Following 6 weeks of individualized MT exercises, some members of the IND-MT group reported increases in self-confidence, concentration, positive attitude, and ability to relax during dart throwing. The PK-MT subjects who reported a change in personality had varying responses. Two of the subjects (18%) who reported a change noticed an increased ability to relax and concentrate during dart

throwing. One of the 11 (9%) subjects who reported a change noted an increase in self-confidence. Another subject reported a negative change, commenting that he had become easily frustrated from participation in the packaged MT exercises. Based on subjects' responses to this question, it is possible that the individualized MT program had a greater effect on personality. However, no definitive conclusions may be made because of the small sample size. Following these questions, the subjects were asked to comment about any aspects not covered by the above questions. Several of the subjects indicated that too much time was spent on particular lessons and it became difficult to concentrate on the exercises. Twining (1949) investigated the effects of MP versus PP in the learning of a fine/gross motor skill. He indicated that subjects who participated in his investigation had difficulty concentrating after 5-min of MP. In contrast, various subjects commented that the MT exercises were beneficial in improving psychological skills (e.g., self-confidence and positive thinking). Overall, the subjects generally indicated that MT exercises could be effective in aiding performance if practiced faithfully.

Unestahl (1982) reported that 5000 athletes who participated in his Inner Mental Training (IMT) program indicated that they experienced more harmonious and relaxed mental and physical states along with better sleep. The

testimonies of both professional and world class amateur athletes like Jack Nicklaus, Chris Evert, Jean Claude Killy, Bruce Jenner, Greg Louganis, and many others support the value of MT programs for achieving excellence in sport. However, very little empirical evidence has been collected on the attitudes athletes possess towards MT. This void of literature is due to the limited number of MT studies and the failure of investigators to document subjective feelings following participation in MT programs.

Summary

In summary, the findings of the current investigation do not support the findings of researchers who found that MT significantly improved (.05 level) performance. The three hypotheses that were posed in chapter 1 were discussed. The first hypothesis stated that there will be no statistically significant differences (.05 level) in mean dart throwing performance among subjects who did 6 weeks of PP, no practice, individualized MT, or packaged MT exercises. This hypothesis was found to be tenable. MT, when coupled with PP, did not produce significant increments in mean dart throwing scores. The second hypothesis stated that there will be no statistically significant difference (.05 level) in mean dart throwing scores between subjects who practiced packaged versus individualized MT exercises. Six weeks of participation in packaged and individualized MT exercises did not produce statistically significant differences (.05

level) in mean dart throwing performance. Therefore, this hypothesis was accepted. The third hypothesis stated there will be no significant increment (.05 level) in psychological skills of subjects who participated in 6 weeks of MT. This hypothesis was found to be tenable. Significant increments (.05 level) in psychological skills scores were not found following 6 weeks of MT.

The failure of MT to produce significant differences in mean dart throwing performance and significant increments in psychological skills scores may be due to several factors. The first and most obvious reason is the 10-day break that occurred between the 5th and 6th weeks of training. Secondly, the training period may have been too short. Several researchers indicated that at least 3 months of training are needed before performance effects are exhibited. Also, dart throwing was found to be an unreliable measure of motor performance for beginning and novice subjects. Finally, it is difficult to gain statistical significance when the number of subjects per group is less than 30 persons. In the present study, sample size was limited to 12 subjects per group. Therefore, the degrees of freedom were small and the F-value needed to gain statistical significance was large.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study investigated the effects of individualized and packaged MT programs on dart throwing performance and the development of psychological skills. The subjects (N = 46) were male (n = 23) and female (n = 23) students 18 to 22 years old who were attending a private college located in the Finger Lakes region of New York State. This 6-week study was conducted during the 1987 spring semester. All volunteer subjects were beginner or novice dart throwers. Following a pretest that consisted of a written 42-item PPI and 50 dart throws for score, subjects were randomly assigned to three experimental groups and one control group. Experimental group subjects were randomly assigned to either individualized or packaged MT programs or PP. The IND-MT and PK-MT groups practiced MT exercises and threw 50 darts 5 days/week while the PP group only threw 50 darts 5 days/week.

The MT subjects (PK & IND) practiced MT exercises in a laboratory separate from the dart throwing area where the environment remained constant throughout the 6 weeks of experimental treatments. The experimenter monitored the subjects daily as they did the MT exercises. The MT subjects were scheduled into 30-min rotating time slots for each of the experimental days. During each 30-min time

slot, four subjects entered the laboratory and signed an attendance sheet. The experimenter provided each subject with a cassette tape that outlined the MT exercises for that week. Four cassette players with headphones were situated on tables at different locations around the room so that subjects could practice MT exercises without being distracted. The subjects were seated in chairs while listening to the MT cassette tapes.

The PK-MT group practiced MT exercises designed by Bennett (1977) for approximately 25-min a day 5 days/week. The PK-MT exercises were contained on a series of six tapes. The program was divided into six lessons. Each lesson contained an overview of the exercises to be practiced that week on Side A and a relaxation exercise on Side B for five of the six tapes. On Side B of lesson 6 the subjects did a special exercise in energy flow. The subjects listened to and practiced the exercises on Side A the first day of each experimental week. On the 2nd, 3rd, 4th, and 5th days of each experimental week the subjects listened to and practiced the relaxation exercises on Side B.

The IND-MT group practiced MT exercises designed by the experimenter's advisor for approximately 25 min/day, 5 days/week. A psychological profile was drawn for each of the subjects based on their responses to questions asked on the 42-item PPI. Specific MT exercises were designed for the subjects based on their psychological needs. For

example, the subjects who needed practice in relaxation received exercises in relaxation training. The subjects who scored low in self-confidence received training in self-confidence. All the subjects practiced exercises in visualization, concentration, and goal setting.

At the end of each MT session, the IND-MT and PK-MT subjects proceeded to the dart throwing area, which was located in a different laboratory. Both the MT subjects and the PP subjects participated in dart throwing 5 days/week for 6 weeks. Upon entering the dart throwing area, both the MT and PP subjects were required to sign an attendance sheet prior to each dart throwing trial. Each of the experimental subjects threw 12 warm-up and 50 throws for score under the supervision of an experimenter. When the subjects completed their 12 warm-up and 50 throws for score, they totaled their points using a calculator and placed their score sheets in a folder that was specifically provided for them. Within each file folder, graph paper was provided so the subjects could plot their total dart throwing scores for each practice day and determine their progress.

Following the 6-week experimental period all subjects took a posttest consisting of 50 dart throws and the PPI. Additionally, the PK-MT and IND-MT subjects responded to a questionnaire that assessed their attitudes towards MT exercises.

The reliability of the PPI and dart throwing tests was determined 1 week after the administration of the pretest and posttest. Fifteen subjects were randomly selected to take retests for the PPI and dart throwing. Testing conditions were the same as the pretest and posttest. Pearson product-moment correlations were calculated for the pretest psychological skills scores (r = .81, p = .0002) and dart throwing scores (r = .35, p = .09). Posttest retest correlations for the psychological skills were r = .94, p = .0001 and dart throwing scores were r = -.12, p = .34.

Descriptive and inferential statistical procedures were used to analyze these data. Group means and standard deviations were calculated for dart throwing and psychological skills variables. Graphical and tabular analyses were used to describe the results of this experiment.

A 2 x 4 factorial design was used to analyze psychological skills and dart throwing performance. Since randomization does not insure equality, analysis of covariance was used to adjust the final posttest psychological skills scores for initial differences that existed between the groups prior to the start of the experiment.

As reported above, the posttest dart throwing test was an unreliable measure of performance (r = -.12). To avoid this problem, a repeated measures ANOVA of the daily scores

was used to determine the effect of MT on dart throwing performance. A .05 level of significance was established for all tests. The first hypothesis stated that there will be no significant difference in mean dart throwing performance amoung the four groups following 6 weeks of practice. The second hypothesis stated there will be no significant difference in mean dart throwing performance between subjects who practiced packaged versus individualized MT. Table 2 shows that the F-value for training did not reach statistical significance. Therefore, the first two hypotheses were accepted. The only statistically significant F found in Table 2 was for Factor B (week). The subjects did improve their dart throwing performance throughout the 6-week investigation.

Seven one-way ANCOVAs were used to test the hypothesis of no statistically significant differences in mean psychological skills scores following 6 weeks of MT. Tables 4-10 indicate that statistically significant increments in the seven psychological skills did not occur as a result of MT. The training in relaxation, concentration, imagery, and other psychological parameters did not significantly improve the subjects' skills as assessed by Loehr's (1982) seven psychological components. Based upon the above analyses, the null hypothesis of no significant differences in mean psychological skills following 6 weeks of MT was accepted.

Conclusions

The results of this study yielded the following conclusions regarding the effects of individualized and packaged MT on dart throwing performance and the development of psychological skills:

1. MT is not effective in improving dart throwing performance.

2. Both individualized and packaged MT programs are ineffective in improving dart throwing performance.

3. Psychological skills are not improved through the practice of MT exercises.

4. Dart throwing is an unreliable test of motor performance for beginning and novice subjects.

Recommendations

The following are recommendations for further study:

1. Dart throwing should not be used to test the effectiveness of MT because it is an unreliable measure of motor performance for novice subjects.

2. The effects of MT programs on motor skill performance and the development of psychological skills should be investigated without a break in the training period.

3. A placebo group should be used to avoid the "Hawthorne" effect. For example, the subjects of this group would be administered an inert pill and told that it contained a special ingredient to enhance performance.

4. Further research should determine the effects of MT using a reliable measure of motor performance.

5. A study should be conducted to determine the effects of MT on high versus low skilled subjects.

Appendix A

INFORMED CONSENT FORM

1. Purpose of the Study. To determine the effects of packaged and individualized mental training programs on dart throwing performance and the development of psychological skills.

   Benefits. You will gain experience in relaxation, concentration, and the use of imagery. Dart throwing is also a fun activity for most participants.

2. Method. The subjects will take a 42-item pretest and posttest to assess their levels of psychological skills, e.g., self-confidence, motivation, etc. Subjects will also participate in a pre-and posttest to determine dart throwing performance.

   Following the pretest, the subjects will be randomly assigned to one of four groups (a) Packaged Mental Training, (b) Individualized Mental Training, (c) Physical Practice, and (d) Control. The Control group will take only the pretest and posttest. The Packaged Mental Training group will practice dart throwing and the mental training exercises developed by Bennett (1977). The Individualized Mental Training group will practice dart throwing and the mental training exercises designed by the experimenter's thesis advisor.

3. Will this hurt? No! There is no physical or psychological danger. You will be supervised at all times while participating in this investigation.

4. Need more information? Additional information can be obtained by contacting Mr. John Vespi, home (272-5525) laboratory (274-3152). All questions are welcome and will be answered.

5. Withdrawal from the Study. Participation is voluntary. You are free to withdraw your consent and discontinue at any time.

6. Will the data be maintained in confidence? All data will be kept in complete confidence. Only mean dart throwing skill scores and psychological test scores will be published in the scientific literature.

7. I have read the above information and I understand its contents and I agree to participate in the study. I acknowledge that I am 18 years of age or older.

_____ _____

Signature Date

Appendix B

PSYCHOLOGICAL PERFORMANCE INVENTORY

Name:_____ Date:_____

1. I see myself as more of a loser than a winner in competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

2. I get angry and frustrated during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

3. I become distracted and lose my focus during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

4. Before competition, I picture myself performing perfectly.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

5. I am highly motivated to play my best.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

6. I can keep strong positive emotion flowing during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

7. I am a positive thinker during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

8. I believe in myself as a player.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

9. I get nervous or afraid in competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

10. It seems my mind starts racing 100 mph during critical moments of competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

11. I mentally practice my physical skills.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

12. The goals I've set for myself as a player keep me working hard.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

13. I am able to enjoy competition even when I face lots of difficult problems.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

14. My self-talk during competition is negative.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

15. I lose my confidence very quickly.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

16. Mistakes get me feeling and thinking negatively.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

17. I can clear interfering emotion quickly and regain my focus.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

18. Thinking in pictures about my sport comes easy for me.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

19. I don't have to be pushed to play or practice hard. I am my own best igniter.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

20. I tend to get emotionally flat when things turn against me during play.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

21. I give 100 percent effort during play, no matter what.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

22. I can perform toward the upper range of my talent and skill.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

23. My muscles become overly tight during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

24. I get spacy during competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

25. I visualize working through tough situations prior to competition.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

26. I'm willing to give whatever it takes to reach my full potential as a player.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

27. I practice with high positive intensity.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

28. I can change negative moods into positive ones by controlling my thinking.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

29. I'm a mentally tough competitor.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

30. Uncontrollable events like the wind, cheating opponents, and bad referees get me very upset.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

31. I find myself thinking of past mistakes or missed opportunities as I play.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

32. I use images during play that help me perform better.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

33. I get bored and burned out.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

34. I get challenged and inspired in tough situations.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

35. My coaches would say I have a good attitude.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

36. I project the outward image of a confident fighter.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

37. I can remain calm during competition when confused by problems.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

38. My concentration is easily broken.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

39. When I visualize myself playing, I can see and feel things vividly.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

40. I wake up in the morning and am really excited about playing and practicing.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

41. Playing this sport gives me a genuine sense of joy and fulfillment.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

42. I can turn crisis into opportunity.

1	2	3	4	5
Almost Always	Often	Sometimes	Seldom	Almost Never

Appendix C

DART THROWING SCORE SHEET

"Mental Training Study"

Date: _____ Name: _____

Directions: Take 12 warm-up throws, then record your next 50 throws below for score.

1.	_____	11.	_____	21.	_____	31.	_____	41.	_____
2.	_____	12.	_____	22.	_____	32.	_____	42.	_____
3.	_____	13.	_____	23.	_____	33.	_____	43.	_____
4.	_____	14.	_____	24.	_____	34.	_____	44.	_____
5.	_____	15.	_____	25.	_____	35.	_____	45.	_____
6.	_____	16.	_____	26.	_____	36.	_____	46.	_____
7.	_____	17.	_____	27.	_____	37.	_____	47.	_____
8.	_____	18.	_____	28.	_____	38.	_____	48.	_____
9.	_____	19.	_____	29.	_____	39.	_____	49.	_____
10.	_____	20.	_____	30.	_____	40.	_____	50.	_____

Total Points: _____

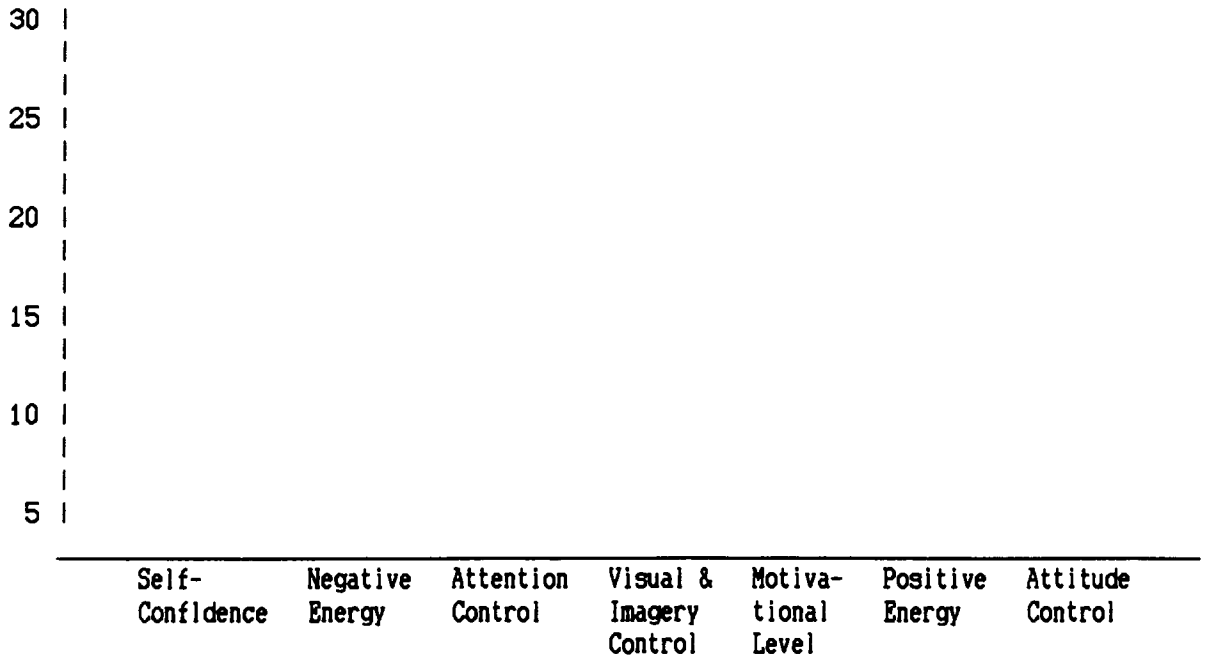
Appendix D

PSYCHOLOGICAL PERFORMANCE PROFILE

Date: _____ Name: _____

Test Scores

Self-Confidence	Negative Energy	Attention Control	Visual & Imagery Control	Motivational Level	Positive Energy	Attitude Control
1._____	2._____	3._____	4._____	5._____	6._____	7._____
8._____	9._____	10._____	11._____	12._____	13._____	14._____
15._____	16._____	17._____	18._____	19._____	20._____	21._____
22._____	23._____	24._____	25._____	26._____	27._____	28._____
29._____	30._____	31._____	32._____	33._____	34._____	35._____
36._____	37._____	38._____	39._____	40._____	41._____	42._____
_____	_____	_____	_____	_____	_____	_____



Appendix E

GOAL SETTING FORM

Individualized Mental Training Group

Name:_____ Week:_____

Write down your goal, in total points, for each day of this week. Evaluate your progress each day.

Day	Goal	Points Scored	Goal Evaluation (Circle)
Monday	_____	_____	YES NO
Tuesday	_____	_____	YES NO
Wednesday	_____	_____	YES NO
Thursday	_____	_____	YES NO
Friday	_____	_____	YES NO

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